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Rotary Hose

Construction and Service

Webster Norris

ROTARY hose is so-called because it is especially made for use in the rotary system of drilling. The performance of the drilling tools and the condition of the hole depend in large degree on the fitness of the hose to function under heavy pressure. Working pressure varies with the depth and the difficulty of drilling. Ordinary pressures may rise to 3,600 pounds, but it is not uncommon for 5,000 pounds to be imposed momentarily.

Rotary Drilling

The rotary system of drilling was designed originally to sink wells through soft formations. It is now applied in boring to great depths through hard formations where the cable tool process was formerly utilized exclusively. The drill-string hook-up comprises a line of drill pipe carrying a drill collar and bit on its lower end. Attached to its upper end is a non-circular drill stem coupled to a swivel and a hook. The latter is connected in turn to a traveling block through which runs a hoisting cable leading over a crown block at the top of the derrick and down to the hoisting drum. Thus the string of drilling tools can be raised or lowered as the progress of drilling requires.

The rotary hose forms a flexible connection between the swivel and the high pressure duplex pumps. In the process of drilling, a flow of fluid colloidal clay mud is maintained by the pumps through the hose and the drill pipe and escapes through the drill bit at the bottom of the well, thence back to the sump at the surface. Thus the cutting face of the bit is kept unobstructed and lubricated. The mud, as it escapes from the bit, rises in the well outside the drill string and acts to plaster and even up the walls of the well. At the same time it brings the drill cuttings to the surface where mud and cuttings flow into the sumphole. Here the drill cuttings settle out and the mud is recirculated through the drill tube and well.

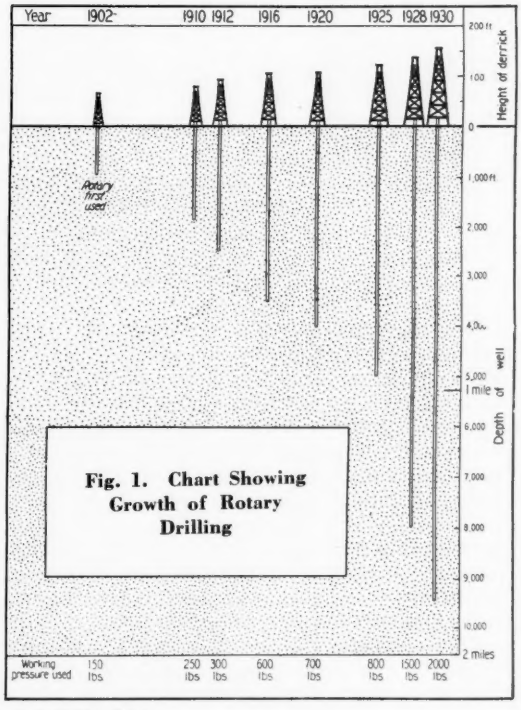


Fig. 1. Chart Showing Growth of Rotary Drilling

N. Y. Rubber Corp.

Figure 1 shows the growth of rotary drilling since 1902 when oil wells were sunk by the system to about 1,000 feet with 150 pounds' working pressure on the hose. In 1930 derricks attained the height of 150 feet; well depths exceeded 9,000 feet. A California well has recently been drilled 10,030 feet deep. At this depth the working pressure was 2,800 pounds. In this connection the hose bearing this pressure does so under continuous pulsations while bent in U-form measuring 4 or 5 feet across. Experiments are contemplated to reach 13,000 to 15,000 feet to test the earth and its temperature at that depth with the idea of drilling wells if conditions are found favorable.

Hose Connection

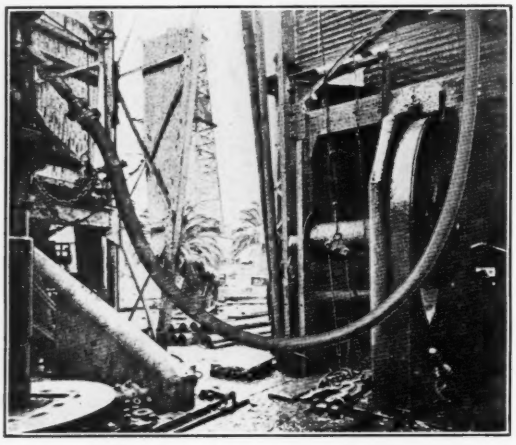
Figure 2 pictures the swivel connection of the lower end of a rotary hose to the top of the well casing. At its upper end attachment is made to the mud circulating pump. Boiler

pressures to actuate the pump have been increased to 350 pounds per square inch to enable the pump to raise the slush from great depths and to exert exceptional power to clear the drill of obstructions. Their removal sometimes necessitates pumping through the hose considerable oil to soften the massed obstruction; consequently rotary hose should be made with an oil resistant tube.

Well Depths

When rotary hose was first used, wells were comparatively shallow. Hose was usually two inches in diameter; so ordinary hose with an increased number of plies was sufficient to do the work.

As the wells increased in depth, greater pressures were required to clear the bits; thus hose had to be strengthened. This action was accomplished by winding with ordinary round wire at the ordinary spacing. This method served its purpose until still larger pumps were introduced to meet the continual demand for deeper wells.



Thermoid Company

Fig. 2. Swivel Connection—Lower End of Rotary Hose

These larger pumps required larger diameter hose to give the necessary circulating volume to the slush, and the pressures on the hose were increased. As a result the wire winding was spaced closer and closer to hold the increased pressure. Greater pulsation of the hose was incidental to the greater pressure resulting in displacement of the wire, thus spreading the space between some of the coils of wire. The fabric, unsupported by the wire at these spaces, bulged and burst. Different forms of wire were used to prevent separation: flat, half round, half round with beads, but all with little success.

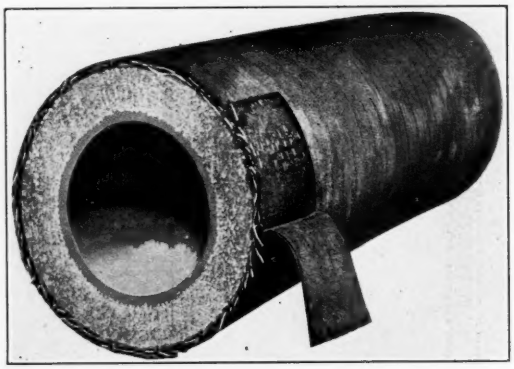
As wells were dug still deeper, more powerful pumps were again necessary. The hose size, consequently, was increased to 2½ inches and often to 3 inches in diameter. The service required of hose exceeded its capability and necessitated first hand engineering study of field conditions by hose manufacturers.

Exacting as these conditions are, successful constructions have been worked out to meet them by the principal American mechanical rubber goods manufacturers. Certain constructions here described and pictured, are successfully used in drilling to 9,000 feet in California. This is one of the greatest well depths thus far attained anywhere in the world.

Super-Strong Hose

The 5,000-pound rotary hose pictured in Figure 3 is built in the following special construction to insure maximum strength. The tube is extra thick, very resistant to abrasion, and very dense to prevent puncture by grit or stone splinters under high pressure. Its oil resistance must be good to allow emergency oil circulation. Pulsations of rotary hose in service cause a severe strain on the union between the tube and the duck plies of the hose carcass. Separation of tube from carcass is prevented by interposing between them a single ply of strong open weave fabric impregnated with friction requiring a pull of 45 pounds per inch of width to separate the tube from the carcass.

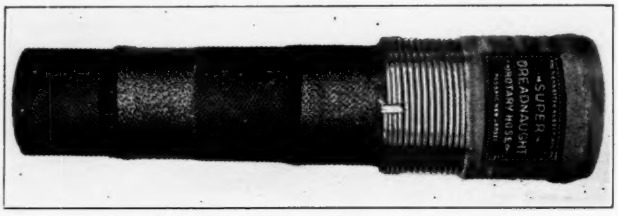
The carcass should be built with straight plies of heavy evenly balanced duck. In other words the warp and the filler should be equal in strength and crimp. The friction grip between plies should be 35 pounds per inch of width.



N. Y. Rubber Corp.

Fig. 3. Wiccapee Rotary Hose

The carcass is further reenforced against bursting pressure by two spiral plies of high carbon flat braided tire bead wire. Each of these plies with a tensile strength of 9,000 pounds per inch width gives a total reenforcement of 18,000 pounds.



Manhattan Rubber Mfg. Co.

Fig. 4. Super Dreadnaught Rotary Hose

Both wire plies are closely wound and spiraled over the duck in opposite directions. A spiral ply of rubber is applied between and over the wire plies to bind them together and attach them to the carcass. Two plies of lighter duck and a thick outside rubber cover are applied for protection of the hose against abrasion.

On a 2½-inch hose under a pressure of 3,000 pounds per square inch the longitudinal strain reaches 15,000 pounds. This must be counteracted by sufficient plies of unusually strong fabric to give the hose 21,000 pounds tensile strength, or a margin of safety of 6,000 pounds. At the usual working pressure of 1,500 pounds the construction noted provides a factor of safety of 280 per cent.

The difference in stress between the wire and the fabric elements is adjusted to allow 8 per cent elongation of the hose under service pressure. This elongation provides relief from shocks due to water hammer and pump pulsations at highest pressures by absorbing the lengthwise thrust of the hose.

Another example of rotary hose built for heaviest pressures and severe drilling conditions is pictured in Figure 4. This hose has an inner tube of the highest quality oil and abrasion resisting rubber, $\frac{3}{16}$-inch thick. Over this are plies of heavy weight hard woven frictioned duck of great tensile strength laid on straight to take the tension caused by the

radial and longitudinal high pressures encountered in service. Next, encased in a heavy matrix of pure rubber are two layers of alloy steel flat cable spirals laid edge to edge. These layers are wound at an angle in reverse directions forming substantially a flexible steel tube that cannot be distorted or ruptured by either radial or longitudinal pressures. In this hose stretch is reduced to a minimum. For drilling shallow wells where moderate working pressures are met rotary hose is built of heavy duck without braided wire internal reenforcement.

As a matter of economy in service the practice is to make all hose of a particular inside diameter with the same outside diameter at ends in all plies. This construction permits the use of the same clamp or coupling for all hose of a certain inside diameter. This condition is realized by building in additional long plies of duck at the ends where the liability of failure is more pronounced; thus the ends can be cut off and the hose recoupled several times if necessary.

Common Hose Failure

The current practice of deep well drilling severely taxes the durability of rotary hose upon the fitness of which, as has been well said[1], the life of a string of drill pipes depends, also the condition of the hole and the footage obtained from the various drilling tools. The author of the article cited, in discussing water hammer as a serious cause of the failure of rotary hose states that the cycle of travel of a water hammer wave is about 4,200 feet per second. The hammer effect thus is completed in a few seconds, and the hammer blow often is raised to 10 times the working pressure registered on the gage.

Another outstanding cause of failure is said to be the pump compoundage method used by some operators to gain high pressures for deep circulation returns; to move stuck strings of pipe; to blow an obstruction out of the bit; and to keep from pulling out the hole. Excessive pressure is particularly certain to blow out rotary hose when it is weakened by the circulation of hot oil through the well.

Care of Rotary Hose

Owing to the thick walls necessary to resist high service pressure, rotary hose should not be coiled on a short radius nor be kinked, crushed, or struck by heavy blows. At the standpipe or swivel ends swing joints should be used to prevent sharp bends. When the hose is placed in service, the clamp bolts should be retightened. When circulating oil, an old hose should be used since the best oil resisting rubber is unable to withstand the deteriorating effect of oil and especially of hot oil. Extension of the standpipe some distance above the rotary hose outlet forms an air chamber with cushioning effect on water hammer, and this condition may save the hose when the bit suddenly becomes plugged or whenever a momentarily heavy pressure is established. In rotary drilling care of the hose is vital to good circulation under heavy pressures.

[1] "Rotary Hose Failures, Causes and Remedies." By C. L. McCorkindale, *Oil Bulletin*, Los Angeles, Calif., Jan., 1930, p. 22, and Feb., 1930, p. 130.

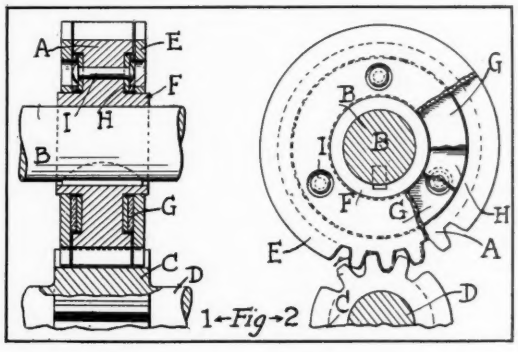
Gear Backlash Silencer

A New Use for Rubber with Broad Possibilities

THE unique adaptability of rubber for silencing the mechanism and body noises of automobiles has been still further extended by the application of rubber to a gear silencer construction for power transmission.

In the production of mating gears a clearance or backlash is allowed to insure free rotation without binding and also to compensate for any distortion in the gears, especially if they are hardened, or for any other irregularities.

In the case where mating gears are subjected to torsional vibrations, as in a transmission or other power transmitting devices of an automobile, objectionable noises occur in their operation.



Vertical Section Side Elevation

Rubber Gear Silencer

In the present invention[1] a construction is arranged whereby, although the clearance mentioned is present, means are provided so that the mating parts are held singly connected, so that one gear is restrained from backlashing relative to the other, thus silencing the mechanism. This result is obtained by a rubber washer associated with a gear and a secondary silencer gear, both having teeth which mesh with another common gear.

This construction is shown in Figure 1 which represents a vertical section and Figure 2, a side view of the device. In these drawings mating spur gears are shown. The one marked A is mounted upon shaft B; that marked C is mounted upon shaft D. Either may be the driving gear. The teeth of these gears are shown in Figure 2 with the usual clearance so that backlash of one gear with respect to the other will take place especially if the gears are subject to torsional vibrations.

The backlash silencer construction comprises a complimentary gear or gears associated with one of the mating gears and meshing with the other. Such a complimentary gear E with narrow face is piloted upon a hub extension or shoulder F of the gear A. Gears E and A are connected in such manner that their teeth are normally staggered relative to each other.

A rubber element G is utilized in the connection between these gears, which is distorted when there is a tendency to line up the teeth on the two gears. This rubber element is bonded to the gear E and to a metallic washer H; rivets I are used for this purpose.

A similar complementary gear, rubber ring, and attaching washer assembly may be attached to the opposite side of gear A as shown in Figure 1.

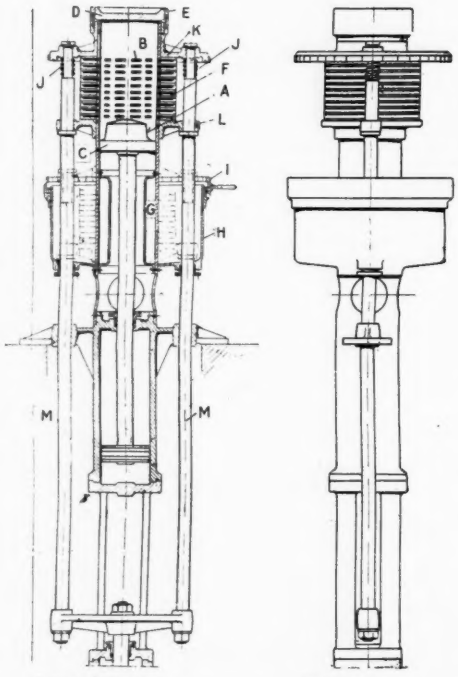
In a transmission thus equipped with silencer the driving effort is at no time delivered through the rubber; consequently the latter is not distorted although an occasional operation in reverse does no damage. This silencer gear assembly may be placed on both or on only one side of a mating gear.

[1] U. S. Patent No. 1,804,906, May 12, 1931.

Automatic Heel Molding and Curing

THE manufacture of rubber heels and other small molded articles required in volume production can be effected with much economy and speed by a molding and curing machine of recent German invention. By its use the steps of processing, subsequent to mixing the stock, that are essential in the customary way for preparing it for curing are all omitted in favor of a new system based on an automatic machine.

The machine[1] is pictured in vertical section and elevation in Figure 1. An operator with this machine can automatically load the molds and without handling them cure the goods and remove them speedily after vulcanization. The machine is designed for hydraulic power and is constructed and operated as follows:



Vertical Section Elevation

Fig. 1. Heel Molding and Curing Press

A is a stock feed and press cylinder supplied in its upper part with mold outflow openings B. The piston C is moved up and down in cylinder A by hydraulic power controlled by an operating valve. A cover D for the feed opening of A is held closed by a bayonet joint ring E. A stack of molds F encircle the exterior of the cylinder A; the lower part of which contains a heating cylinder G for vulcanizing the molded articles. These can also be heated from the exterior by steam in jacket H. The latter can be closed by the bayonet locked cover I.

The differential construction of the piston has for its purpose facilitating the lateral flow of the stock mass and compressing the balance of the compound pushed out after opening cover D with the new charge. For warming up the stock charge the piston C can be built to be heatable.

Operation

Sufficient composition is placed in the feed and pressure cylinder A, and the cover D is locked. Piston C is at this time in its lowest position while the stack of circular molds is in its upper position. In this position the molds, after filling, are under only enough pressure to cause a slight outflow of material through the slits B. This pressure is regulated by the springs J. During mounting and demounting of the molds these springs raise the cover K over the molds and allow enough space between K and the bottom L for servicing the molds. Press cylinder A is filled with enough material to fill the stack of molds two or three times.

The molds supplied with material in this way are lowered, guided by the draw and press rods M into the vulcanizing section H where the molds are indicated by dotted lines. Here they are locked steam tight under cover K by bayonet ring I and vulcanized. The space G is kept constantly heated by steam or hot water.

After vulcanization the curing chamber is unlocked and the mold stack is raised to its first position for unloading the goods and refilling for the next cure. In this way from 160 to 200 heels can be molded and cured in the interval of eight to ten minutes.

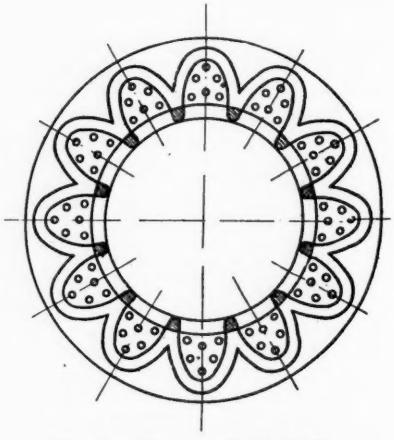


Fig. 2. Circular Heel Mold

Operating Schedule

TIMING OF THE VARIOUS OPERATIONS IN SECONDS

		Seconds
1.	Raising the piston to end, switching lever	5
2.	Introducing the weighed charge preheated to 50-60° C	30
3.	Lowering piston until slit becomes visible, and inserting wedge	10
4.	Opening bayonet ring	5
5.	Raising piston by switching lever	5
6.	Removing heels from molds	140
7.	Coating molds with solution	80
8.	Setting heel washers on mold pins	180
9.	Turning spur gear	5
10.	Lowering piston merely switching lever (loading period)	80
11.	Lowering bonnet, drawing bayonet ring, and letting in steam	60
	Total	600

Mold Construction

In Figure 2 the construction of the circular mold for heels is shown. The under side of each mold forms the closing for the one below. To prevent or reduce the uneconomical outflow the molds interlock so that the stock can overflow only slightly in a prescribed plane during charging. The distances from mold to mold during the period of charging are so fixed that vulcanized heels are produced without press defects and with very little overflow.

The space, the material, and the operating time saved by this method of molding make for great economy of production.

[1]German Patent, P. A. 916.758, Oct. 27, 1930.

Value of Softeners

in Tread Stock[1]

M. J. DeFrance and W. J. Krantz[2]

SOFTENERS are used in tire tread compounds essentially for facilitating factory processing. This is accomplished through their ability to produce more plastic stocks and thus permit smooth processing at lower temperatures. Certain softeners possess other valuable properties, such as favorable effects on dispersion, bloom, tack, activation, antiscorching, etc., and quite often such materials are compounded primarily for one of these reasons rather than for their softening action.

From a cost standpoint the efficiency of certain softeners in producing a given plasticity in less time and with less mechanical work than is otherwise required, is to be considered. Most common softeners have a lower volume cost than rubber, and their addition to a compound therefore lowers compound costs. In any event the addition of softeners, for whatever purpose, is made with full cognizance on the part of the compounder of their subsequent effects on the cured properties of the stock and on product performance.

It is the purpose of this work to consider three softeners from the standpoint of product performance based on tread-wear measurements and to compare these results with those obtained in the current laboratory tests. Since the quantity of softener used in a given stock is determined largely by the individual factory machines on which the stock is to be run, no attempt has been made to recommend any softener ratios. However the stocks studied include all normally compounded ratios, and their relative plasticity has been determined on two instruments believed to give reliable indications of tread processing so that from these data some idea may be gained of the handling properties of these stocks.

The three softeners studied were pine tar, mineral rubber, and stearic acid. All three were taken from large commercial lots and had the following properties:

Pine Tar. Specific gravity at 60° F., 1.065; viscosity (Stormer) 50 gram weight at 75° F., 12; initial boiling point, 90° C.; 10 per cent distilled, 206° C.; 30 per cent distilled, 280° C., 80 per cent distilled, 358° C.

Mineral Rubber. Melting point (cube method), 170° C.; penetration at 75° C., 94.

Stearic Acid. Melting point, 52.5° C.; acid number, 208; saponification number 209; iodine number 11.1.

Compounding

In compounding the pine tar and mineral rubber one base stock containing 4 parts of stearic acid per 100 rubber was used. The composition was as follows:

	Parts
Rubber	100.00
Gas black	40.00
Zinc oxide	5.00
Sulphur	3.00
Captax	1.25
Stearic acid	4.00
Softener	Varied 0, 1, 2, 4, 8, and 16

The effect of pine tar and mineral rubber on cure was regarded as slight in this stock, and no adjustment of vulcanization ingredients was made for this reason.

Stearic acid, while possessing considerable softening action, has a distinct activating effect on Captax in this stock and is used primarily for this reason. A comparison was made of the effect of varying stearic acid in the stock containing 4 parts of pine tar per 100 rubber. The three ratios of stearic acid selected were 2, 4, and 8 parts per 100 of rubber. The effect of reduction of stearic acid in lowering tensile properties was realized, but the writers' interest lay in testing a stock of this composition regardless of tensile properties.

Plasticity and Tensile Tests

The extrusion plastometer tests indicate that pine tar is more effective as a softener than mineral rubber. These two softeners lower the modulus and tensile of cured stock; pine tar softens to a slightly greater degree than mineral rubber. This softening action was perceptible with the addition of one part of either of these materials.

Road Tests

The road tests on these stocks were made on two hundred, 30 by 5, six-ply truck type tires run in taxicab service in Philadelphia. The test began in August, 1929, and was completed in the late spring of 1930. Stocks were compared by making one-half of the tire of control stock and the other half of the stock containing the softener. In comparing stocks, 1, 2, and 4 per cent pine tar or mineral rubber were run against 0 per cent as a control; while the 8 and the 16 per cent stocks were run against 4 per cent as a control and the latter ratings calculated in terms of 0 per cent softener. This was done to preserve tire balance as much as possible and to prevent errors due to large differences between two stocks on the same tire. The tires were measured prior to running on the road and when worn to approximately one-third of their original button height. Two methods of measurement were used: namely, the button height method, which determined button height above the base of the grooves; and the over-all method, which measured the total change in thickness of the tire by means of a caliper device. The data from these two methods checked within reasonable limits, and the average was used for computing losses and ratings.

The net effect of either of these materials is to decrease the road-wear resistance, mineral rubber causing more marked decreases than pine tar when added in small amounts. However beyond 4 per cent it shows distinctly better resistance and throughout the range shows less variation from the average values. The fact that maximum values show ratings above the control for the addition of small amounts explains the occurrence, at times, of tests which indicate an improvement with the addition of such materials.

It is realized that the method of compounding here used, in which the softeners were added to a base mix, changed

[1] Presented before the Division of Rubber Chemistry at the 81st Meeting of the A. C. S., Indianapolis, Ind., March 30 to April 3, 1931. Abstracted from *Ind. Eng. Chem.*, July, 1931.

[2] Goodyear Tire & Rubber Co., Akron, O.

the percentage volume loading of gas black in the compound. The other method would have been to hold the percentage volume of gas black constant. If the base mix method is considered on the percentage-by-volume basis, it will be found that the gas black content has been reduced by approximately 2 per cent in the stocks containing the maximum loading of softener. Based on a number of road tests, such a reduction in loading would decrease tread wear by not more than 8 per cent, and this decrease would, of course, diminish as the percentage of softener is decreased.

The effect of stearic acid on tread wear may be seen in Table I.

TABLE 1. EFFECT OF STEARIC ACID ON TREAD WEAR
(Base stock plus 4 parts pine tar plus stearic acid)

Stearic Acid in Stock	Rating		
	Av.	Max.	Min.
Parts	%	%	%
2	95	97	90
4	100	100	100
8	97	106	92

Thus we can conclude that the optimum ratio of stearic acid for this stock is approximately 4 parts per 100 of rubber.

Abrasion Test Comparison

The various abrasion abrasion test methods used have been fully described by Vogt[3] and, therefore, will be described only briefly here.

Method A. regular Goodyear machine, 16-degree angle.
Method B. 30 per cent slip machine.
Method C. 20-degree angle machine.
Method D. du Pont-Grasselli abrader.

Examination shows method B to produce data most comparable with the road-wear ratings. Method A in each case lies above the road wear, while methods C and D are considerably below. It might be remarked in this connection that Lambourn[4] has found a variable slip machine to give very good agreement with road-wear values, and the present data lend support to such a conclusion.

The data in Table 2 were obtained from the stearic acid stocks using methods A and D.

TABLE 2. EFFECT OF STEARIC ACID ON ABRASION RESISTANCE
(Base stock plus 4 parts pine tar plus stearic acid)

Stearic Acid in Stock	Av. Road Wear	Method A	Method B
Parts	%	%	%
2	95	87	98
4	100	100	100
8	97	109	109

The high ratings of the stock containing 8 per cent stearic acid are, no doubt, due to the lubricating action of an excess of this material, which has been previously reported by North [5].

Tensile Test Comparisons

The elongation increases, as would be expected, with increased softener while the modulus and tensile values are decreased. The average tensile does not decrease so rapidly as the average road wear, but the modulus values drop off more raidly. These values are not so widely divergent as the abrasion data, but no one of them presents an accurate index of road-wear resistance.

Tear Test Comparisons

Comparative ratings were made by a tear test which employs a rectangular test piece cut from standard laboratory test sheets. The dimensions are approximately 7.62 by 5.08 cm. (3 by 2 inches) with the length in the direction of the grain. A cut is made with the shears 2.54 cm. (1 inch) long in the center of the test piece in the direction of the grain. Two jaws are then fastened to the sample approximately 1 mm. from the edge of the cut. One jaw is 2.54 cm. (1 inch) wide and extends over the length of the cut; while the other is 7.62 cm. (3 inches) wide and extends over the entire width of the test piece. The jaws are separated on a Cooey machine, and the pull is recorded. The test is an effort to duplicate the conditions of hand tear. The tear is measurably improved with the addition of softeners, and mineral rubber produced more improvement than pine tar. The durometer ratings of the tires after curing showed that the hardness of the stock containing no softener was 62 and that of the stock containing the maximum of softeners, 57.

Economy

From an economic standpoint the savings to be effected by the use of softeners are dependent on a number of processing advantages which are impossible to evaluate in accurate cost figures. For this reason simple compound costs do not tell a complete story. However if softeners are to be effective as a means of giving lower quality tread stocks at a lower volume cost, the decrease in cost should be the same as the decrease in quality as the softener is increased. With the present prices on rubber and other compounding ingredients, this order does not hold. For example with the addition of 16 parts of pine tar the compound cost is reduced to 93 per cent of that of the control while the tread wear is reduced to 67 per cent. In the case of mineral rubber the cost is reduced to 92 per cent while the tread wear is reduced to 75 per cent.

Conclusions

In view of these results it may be concluded that in this tread stock the minimum amount of pine tar or mineral rubber commensurate with good factory processing is desirable if the maximum abrasion resistance for a given cost is to be obtained. This means that softeners which are effective, as such, in smaller amounts than those available at present should find a use in tread compounding. Stearic acid should be held to a ratio of approximately 4 parts per 100 of rubber.

Most of the laboratory tests give indications in the same direction as the road wear, but none of them coincide exactly.

[3] Vogt, *Ind. Eng. Chem.*, 20, 140-49 (1928).
[4] Lambourn, *Rubber Chem. Tech.*, 2, 166-92 (1929).
[5] North, *Ind. Eng. Chem.*, 21, 722-23 (1929).

Sea-Loading Hose

The severest service to which rubber oil-discharge hose is subjected is said to be that of loading tank ships at sea near Santa Barbara, Calif., where the Rio Grande Oil Co. ships oil from its Elwood field many miles inland. Three other companies ship oil similarly on the Pacific Coast, but unlike the Rio Grande Co. they always lift the hose from the sea bed after each tanker is loaded. From the Rio Grande pumping station on the shore a 2,000-feet stretch of 10-inch steel pipe extends outward on the ocean bottom. From the end of the steel pipe and at a depth of 65 feet is attached 240 feet of 8-inch rubber hose. At the far end of the latter is a heavy capping device which can be readily unscrewed and replaced. The hose lies freely on the sea bed, and to its cap is attached a strong chain, the end of which is fastened to a buoy on the ocean surface.

When a tanker appears for loading it is moored to floating air-filled metal cylinders. A winch pulls up the hose from the ocean bottom, and it is connected with the ship's tanks. Delivery then starts. When the tanker is full, the line is uncoupled, the hose recapped and returned to its bed in the ocean.

The hose used is made of 9 plies of heavy rubberized duck with an extra tough oil-resistant rubber tube and cover, and comes in 30-foot lengths.

Albertoni Testing Machine[1]

George J. Albertoni[2]

THE machines heretofore available for testing the tensile properties of rubber are open to criticism because of calculations required and the personal error involved in determining the elongation. A new stress-strain recording machine has been perfected in which the strain recorded responds to the separation between a pair of independently movable pointers which may be made to follow the separation of two marks spaced upon the sample before its insertion into the machine. Mechanical means are utilized to correct for variations in the test piece cross-section and to produce equal chart displacements for equal angular deviations of the inclination balance.

Figure 1 represents diagrammatically the fundamental principles on which the performance of the machine is based.

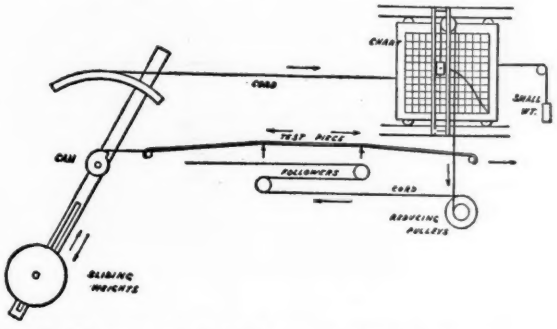


Fig. 1. Diagram of the Albertoni Tensile Testing Machine

As indicated at the left, the force-measuring device is a modified pendulum balance. The weights operate in a slot and can be raised or lowered to decrease or to increase the length of the operating arm. At the center of the pendulum, secured to the shaft, is illustrated the type of cam used to maintain such a rate of loading as to produce, on the chart, equal spacing for equal angular deviations of the pendulum.

At the center of the sketch is shown the method of recording the load and the method of transmitting to the recording pen the separation between marks. A slight tension of the cord interconnecting the movable members of the elongation system is effected by the small weight of the pen carriage. The method of obtaining the vertical line expressing the ultimate load is also obtained by the indirect action of the weight of the pen carriage. In fact, this will drive together the two followers as soon as the test piece breaks and, therefore, as soon as the points of the two followers are released from their hold against the rubber sample.

Figure 2 shows on the same chart the stress-strain curves obtained by three typical factory stocks: a tread stock, a carcass stock, and a truck tube stock. In this chart the load is expressed in pounds per square inch. The curves are, however, generally recorded in charts expressing the load in kilograms per square centimeter. The straight lines parallel to the elongation axis determine with the load axis the ultimate load of the test pieces. The two types of charts are so designed as to make the reading interchangeable.

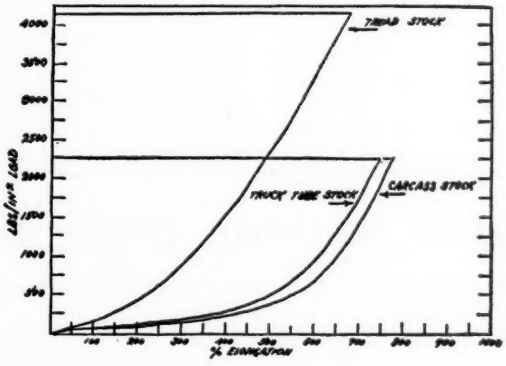


Fig. 2. Stress-Strain Curves Obtained with Three Factory Stocks

The type of test piece used is the ordinary dumb-bell; 1 cm. is the width of the reduced portion. Marks at a definite distance are made on the narrower part.

Referring to Figure 3, the test piece is secured at one end to the clamping device of the carriage A attached to the inclination balance. Bridging over the pointers of the elongation carriages, the other end is clamped to the sliding member B. The plate is adjusted by means of the small drum in such a position that the tracing device moves on the ordinate, passing through the value zero of the abscissa when the pendulum is in the vertical position. The carriages C and D, drawn in contact by the weight of the member E, are dimensioned in such a way that the corresponding pointers are at the same distance as the distance between marks.

During the initial elongation of the test piece these pointers are set to correspond with the marks, no further attention is required after the first few inches of stretch. Further, since the carriages C and D follow the separation of the marks, the tracing pen moves proportionally along the ordinates of the coordinate paper and records the load imposed and the resulting elongation.

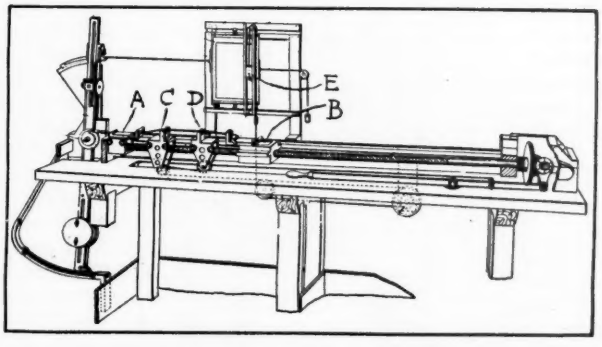


Fig. 3. Operation of the Machine

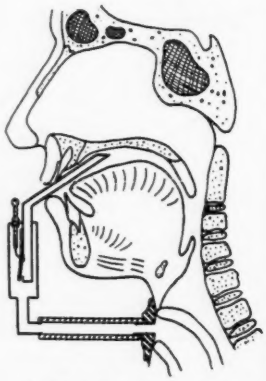
[1]Presented before the Division of Rubber Chemistry at the 80th meeting of the A. C. S., Cincinnati, O., September 8 to 12, 1930. Condensed from *Ind. Eng. Chem.* (Analytical Ed.), July 15, 1931.

[2]Research Laboratories, Goodyear Tire & Rubber Co., Akron, O.

Rubber Aids Voiceless

Mute Regain Speech Through Simple Fitment Supplanting Lost Larynx or Palsied and Unused Vocal Cords

SCIENCE with a simple device in which rubber plays an essential part has come to the relief of those who, through accident or because of an operation to correct a laryngeal lesion, have lost the power of speech. This fitment, which is virtually an artificial larynx or voice-box, is the invention of Dr. R. R. Riesz, of the Acoustical Research Department of the Bell Telephone Laboratories, New York, N. Y., and comes as a boon to a great many who had believed that they were doomed for the rest of their days to that strange state of incapacity and loneliness in which dwell the dumb.



Artificial Larynx Connected by Rubber Tubing and Pad with Terminated Windpipe

When the larynx, situated at the top of the windpipe, is removed, the power of speech is, of course, destroyed because the air stream from the inflated lungs cannot reach the mouth nor force itself through the narrow slit formed by the contraction of the vocal cords. The latter in vibrating on the deflation of the lungs change the steady current of air outward to a pulsating sound wave which is further modified by the resonating action of throat, mouth, and nose cavities, tongue, teeth, and lips, and is finally radiated into the air as articulate speech.

The vocal cords have a counterpart in a vibrating element in the artificial larynx. It consists of a thin metal reed, clamped at one end and free at the other. The lower one of the metal tubes leading from the mechanical voice-box is connected to the end of the windpipe at the front of the neck by means of a tube and coupling pad of the finest surgical rubber. When the user would speak, he blows air from his lungs through the artificial larynx, vibrating the metal reed, such vibration alternately stopping and starting the flow of air and producing a series of sound waves like those generated by normally functioning vocal cords.

Bell Telephone Laboratories

Dr. Riesz Utilizing Bellows Instrument

A simple adjustment adapts the instrument to either the male or the female voice. When the upper or outlet tube is put in the mouth and the user goes through the usual motions of speaking, he can after a little practice talk with remarkable ease and distinctness. At the side of the device is a breathing hole through which the user can inhale; and this hole he covers with his thumb when he desires to speak via the mechanical route.

A bellows, usually held under one of the arms, is furnished for those who have not lost their voice-boxes, who were born mute, or who suffer from a chronic form of aphonia. They, too, can soon learn to speak freely by using such lung substitutes with the artificial larynx. Into the latter the user forces air through a rubber tube from the bellows. He should be careful not to exert his vocal cords at the same time. On going through all the motions of talking he soon finds himself able to use his tongue and add much to his happiness and efficiency.

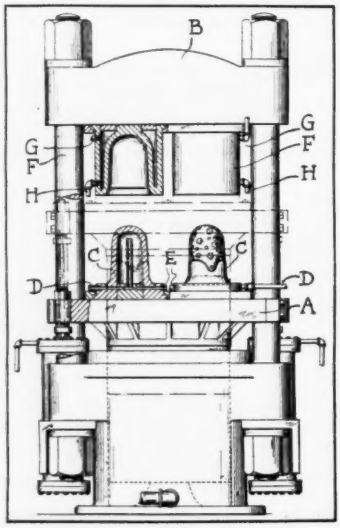
Molded Bathing Head Gear

Production of Seamless Well Fitting Caps

A METHOD of making the popular seamless type of bathing caps which are molded to fit the head has recently been patented.[1] The molds are built for steam circulation in both halves and can be fastened for operation in an hydraulic press shown herewith.

The illustration is a front elevation of the assembled apparatus adapted for molding caps. Portions of the drawing are broken away to show the construction of the molds.

Mounted upon the movable platen *A* of the hydraulic press *B* is a pair of hollow mold members *C* of identical construction. The external surface of each mold member *C* is suitably embossed with the design to be molded on a cap. The embossed portion is slightly inset from the contiguous unembossed portion to provide a molding when the respective halves of the mold are brought together in molding position.



The mold members *C* are heated by steam circulation for which provision is made by inlets *D* and outlets *E* for drainage. The opposite hollow mold members are attached to the head of the press. They also are provided with steam inlets *G* and drainage outlets *H* for heating the mold.

The heat of the mold members causes rubber composition placed upon the embossed form to fill completely the mold cavity and produce a seamless cap. The mold parts are made sufficiently tapering to permit them to draw apart without injury to the molded article. The separation of the mold is accomplished by the action of gravity when the hydraulic press is opened.

[1] U. S. Patent No. 1,794,192, Feb. 24, 1931.

Rubber Goods Export Outlook[1]

Trade Expert's Analysis of Recent Slow-Down — Tires Hold Up Best With Specialties Next — Is Building Branch Factories Abroad Overdone?

THE United States is but one of many countries which have suffered keenly in the recent past through lowered exports of rubber products. But as compared with manufacturers in some of the countries abroad, Americans stand an excellent chance of retrieving much of the lost ground through individual enterprise and wise cooperation. Conditions generally are even much worse this year than last year; yet the fact that the present depression in the rubber goods trade started in this country about a year in advance of that of foreign countries may also indicate that the depression will run its course here sooner than it will abroad. There are signs of the domestic tire business being on the road to recovery, but the export business in rubber goods seems to be in its worst period.

E. G. Holt

Even though American export trade has escaped the demoralization it experienced in 1921, foreign business has of late become increasingly competitive, price being an important factor, and sales resistance has been growing stronger as a result of various nationalistic influences. The extent to which rubber goods exports have declined is indicated by the fact that while the weighted volume in 1930 was 13.5 per cent less than in 1929, in the first four months of 1931 it had dropped to 23.4 per cent as compared with the first third of 1930. The average decline in export prices in 1930 as compared with 1929 was 10.5 per cent, and in the first four months of this year as compared with the same months of last year the drop was 11.4 per cent. The total value of rubber goods exported declined 22.6 per cent in 1930; while for the first four months of 1931 the decrease was 32.2 per cent.

Tires Make Best Showing

"Our export trade in tires, in spite of a growing number of foreign branch factories, has held up better than any other line. Tire exports declined only 9.3 per cent in 1930, and in the first four months of 1931 only 16.7 per cent as compared with the same period of 1930 (leaving out exports to Argentina, the decline was only 15 per cent). Partly this better showing is because we occupy so strong a position in the automobile tire trade throughout the world; partly it is because American companies have pioneered the development of truck and bus pneumatic casings and the use of pneumatic tires on these vehicles has gained the same popularity abroad as in America.

"To a considerable degree I believe this is because most of the companies exporting tires cooperate through a Webb-Pomerene export corporation and have facilities through which to present a united front to foreign competitors. Not all difficulties are capable of solving through this corporation, but much has been accomplished in maintenance of uniform prices and policies."

[1] Abstracts from an address delivered by E. G. Holt, Chief, Rubber Division, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, before the Akron (O.) Export Club, June 24, 1931.

Limiting of Foreign Branches

It is also possible that these associated companies might also find a way, perhaps by cooperating with leading foreign competitors, to restrict a possibly risky expansion occasioned by the establishment of foreign branch factories. Despite the fact that facilities now exist for supplying far more tires than the world market demands, "the desire to lower distribution costs and get inside the tariff barrier of certain large foreign markets is tempting and leads to further overcapacity. Perhaps the time will come when the leading tire companies engaged in international trade will give consideration to an agreement not to establish branch factories in any additional countries.

"Tire manufacturing would not develop rapidly abroad without the backing of these leading companies; the technical problems involved make for concentration of production in the hands of companies with highly trained chemical, engineering, and research staffs which small new ventures could not possess. It would help to maintain production at a higher rate in the home factories of each company and give added domestic employment. There is another good reason for not carrying the branch factory idea too far, and that is the uncertainty of political security in some countries and the possibility of unforeseeable but very detrimental tariff changes and tax changes."

Specialties Show Up Well

"Our second best section of the industry insofar as its export showing is concerned, is the sundries and specialties field, including druggists' sundries, toys, stationers' rubber goods, bathing caps, and so on. In this field our exports suffered an average volume decline of about 11 per cent in 1930 and 19.4 per cent in the first four months of this year.

"The United States affords so broad a market that many specialties are developed here that it would not be worth while to manufacture in any single foreign market, and our exporters are able to sell limited quantities of these goods in each foreign market, giving in the aggregate quite satisfactory results. These general conditions should obtain in the future, and assure a continued export trade in rubber specialties. But I think that the most credit for this comparatively good showing is due to the export managers who have built a world-wide distribution of their products."

Mechanicals Drop Sharply

Exports of mechanical rubber goods, however, do not show up well. The volume decline for 1930 was 23; while the drop in 1931 thus far has been 34 per cent, with the American loss being greater than that of foreigners. Price cutting abroad and refusal by many Americans to meet foreign prices are blamed largely for the loss in business. But in the long run American products in which quality counts largely will come into their own again.

Even worse has been the fate of the American footwear trade abroad. Exports in this field in 1930 dropped 40, and so far in 1931, 50 per cent under 1930. In other words we are exporting less than a third of the 13,000,000 pairs of rubbers, rubber boots, and canvas rubber-soled shoes we marketed overseas in 1929.

Why Foreign Footwear Sells Well

"Many other countries which have been in the footwear trade for a long time, including United Kingdom, France, Canada, Latvia, and Sweden, and even Russia, also experienced losses but not so severe as our own in 1930, except in the case of Russia, 39 per cent, and Sweden and Latvia, whose volume declined 50 per cent. The countries which actually exported more rubber footwear in 1930 than in 1929 include Japan, Czecholovakia, Germany, Belgium, Norway, and perhaps Poland. Other countries important in this trade are Austria and Straits Settlements.

"In all these foreign countries labor costs are lower than in the United States and Canada, or than in the United Kingdom. There is not very much technical skill involved in producing footwear except rubber boots, and the foreign producers quickly learn to put out a product that will give reasonable service in comparison with its price, and price is a strong argument today.

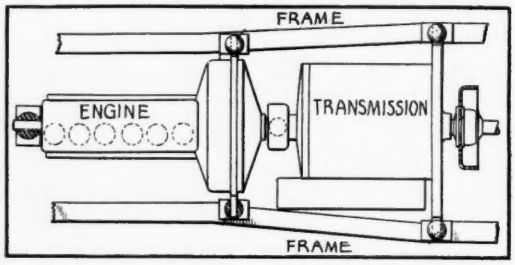
"The future of our export trade in this branch seems just now to be limited to the market for high quality footwear. Perhaps there will be some reaction against the low-priced footwear because of unsatisfactory quality, but it would be over optimistic to expect an early recovery of the trade to anything like former levels."

Benefits of Cooperation

Just as tire exporters have benefited through a Webb-Pomerene corporation, American rubber manufacturers generally might derive much advantage from wise cooperation in marketing abroad. As a result of those manufacturers cooperating with their national association in the assembly of statistical data for better management, unemployment in the tire industry at the low of November, 1930, compared with the peak of May, 1929, was less severe than at the low of early 1921 as compared with the peak of late 1919; and from last November to May, 1931, employment has gained steadily. The entire industry will be benefited by all rubber manufacturers contributing to the association such statistical data as it seeks for better stabilizing trade.

Motor Vehicle Suspension

THE use of rubber in suspensions for motor vehicle units has steadily increased since its introduction on passenger automobiles a few years ago. In general it is customary to use the three-point suspension principle for the absorption of vibration between the chassis and the engine of the vehicle, with the transmission more or less rigidly united with the engine and the clutch housing.



Unique Three-Point Floating Power Suspension

In motor vehicles of heavy duty type the units are often of such bulk and weight that in the conventional unit power plant design the overhanging weight and the torque reactions of the transmission occasion distortion and vibrations of destructive nature. Independent suspension of the units requires more space than is conveniently available in practical commercial types of vehicles.

A recent invention[1] combines in large measure the compactness of the unit power plant with the adequate support of the separately mounted transmission. Advantage is also secured of three-point suspension for each unit with but five points of attachment to the frame.

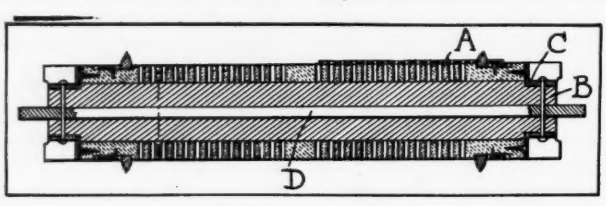
The method of accomplishing this is shown in the accompanying illustration, which pictures the engine and the transmission units each suspended on rubber at three points. The third point for the transmission is carried by the rear end of the clutch housing. The usual transverse supporting arm required at the forward end of the transmission is eliminated by this construction, and the structure is accordingly simplified.

[1]U. S. Patent No. 1,778,028, Oct. 14, 1930.

Rubber Loom Cylinder

One That Can Be Worked and Milled Without Chipping

A RUBBER composition shell for use on Jacquard looms has recently been patented.[1] It is molded in square cross section, a longitudinal section of which is shown at *A* mounted on a wooden core *B*. Metal ends *C* are fastened to the shell in any convenient manner, and a shaft *D* extends through the core. The shell is perforated with holes of any desired shape in which the needle of the loom may fall.



The cylinder is built with a composition shell which can be worked and milled without breaking as wood will do. The new shell costs less but lasts longer.

The preferred composition for this shell follows:

Ingredients	Pounds
Clean roll brown crepe	35.0
Zinc oxide	10.0
Dixie clay	25.0
Cycline oil	3.0
Lime	8.0
Accelerator	0.4
Sulphur	15.0

This mixing is calendered and the sheeted stock placed around an iron core and molded or wrapped with fabric for curing.

The cure used is a stepped cure of the following stages: 1 hour at 260° F.; 1 hour at 274° F.; 1½ hours at 287° F.

The vulcanized shell is perforated and assembled on the the wooden core as illustrated.

[1]U. S. Patent No. 1,793,722, Feb. 24, 1931.

Rubber Uses in Dentistry

Demand for Time-Honored Material Strong Despite Much Competition—Meets Exacting Customer Requirements—Vulcanite Curing Technique — Typical Formulas — Many Soft Rubber Auxiliaries

United States Rubber Dental Chair Mat

IN USE three-quarters of a century and still going strong is the record of rubber for artificial teeth bases. Despite the active rivalry of synthetic resin and other substitutes for the time-tested rubber, the latter continues to be the most popular material for such uses and is likely to remain so among 70,000 dentists who practice in the United States and a host abroad.

The continued lead of rubber is due not merely to its being much more reasonable in price than most of its rivals but that it is easier for operators to handle and conforms more generally to consumer requirements. It is used for expensive plates as well as for those costing but $5, and many dentists advise patients that no plates can be made to look better, be more comfortable, and give longer service under the most trying conditions than those well made from choice hard rubber compound.

S. S. White Dental Soft Polishing Cups

What Consumers Expect

The wearer of such denture requires that the teeth replacing his lost biters and grinders shall be embedded in a material not only resembling healthy gums, but which shall be permanent in color, light but very strong, tough, easily molded in the plaster casts of his mouth, that will not tend to pull away from the new teeth, be capable of taking and retaining a high polish, be unaffected by normal or abnormal mouth secretions, and equally resistant to heat and chilling. Some of the rubber substitutes have several of these qualities, but rubber has them all; or they may be imparted to that material by makers of the compound and the dental operators.

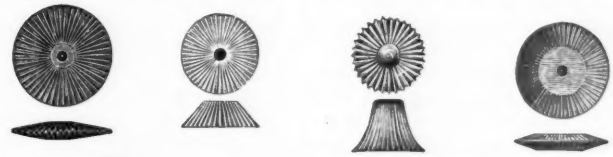
The latter require unvulcanized base rubber to be fresh, with maximum gum and minimum filling, and in a variety of shades. The latter now include pink, light, medium, and dark red, maroon, gold and olive base, weighted brown, metallic weighted, golden, and black, plain and weighted. Metallic pigments are used for coloring, such as vermilion (mercuric sulphide) and zinc oxide; and for blacks and blending ivory, drop, jet, or lampblack may be used. Aniline, alizarine, and vegetable colorings are burned out in the long curing. Veneers, or surfacing rubbers, come in various pinks, veined and granulated, and white. The sheets are 3 by 5 inches and interlaid with holland, to prevent sticking.

Base Rubber Formulas

While each manufacturer has his own formula, the following may be given as general types of base rubbers, the figures denoting parts by weight:

Dark Brown		Red		Black	
Rubber	48	Rubber	48	Rubber	48
Sulphur	24	Sulphur	24	Sulphur	24
		Vermilion	36	Ivory or Drop Black	24
Dark Pink		**Grayish White**		**Jet Black**	
Rubber	48	Rubber	48	Rubber	48
Sulphur	24	Sulphur	24	Sulphur	24
Zinc Oxide	30	Zinc Oxide	96	Ivory or Jet Black	48
Vermilion	10				

When base rubber sheets become dry, they may be restored by softening them in warm water, removing the holland, and brushing the sheets with warm soap suds. After rinsing in warm water and drying, both sides of the sheets are rubbed with a soft sponge dipped in oil of turpentine. When the latter has been absorbed, the sheets are ready for use.



S. S. White Dental Corrugated Soft Rubber Disks

Davol Rubber Dental Gas Bag

Pink rubber veneer is imitated by painting the vulcanized plate two or three times with this solution and afterward polishing with prepared chalk: pink celluloid, 15 parts by weight; cedar wood oil, 5; and acetone, 30 parts.

Making Vulcanite Plates

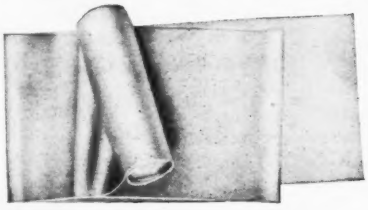
A rubber base plate, as for an upper set, is made by taking an imprint of the gum and palatal arch in an impression tray containing a plastic material that will later harden, as plaster of paris, or a compound of gum kauri, stearin, and talc. When the matrix hardens, it is slightly oiled and filled with plaster of paris paste.

The latter, on solidifying, supplies the cast on which is formed the base plate with its assembled teeth. The latter are set into the cast with wax, and a wax plate is built up to form a model for the final rubber set. After the wax plate has been found to fit it is replaced in the cast and the whole deposited in slow-setting plaster of paris held in a small iron flask, as the two-piece, bolted mold, or foundry, is termed.

Waxed paper, tinfoil, or a thin cellulose film may be used to prevent the plaster from sticking to the rubber. After the investing plaster has solidified, the upper and the lower sections of the flask are parted and the wax is melted and flushed out with boiling water, leaving a facsimile impression in the plaster. The latter is then well packed with the sheeted base rubber, the flask closed, and in a screw press the contents get a squeeze of from 1,200 to 1,800 pounds, forcing the rubber into the tiniest cavities. The flask is then well bolted, excess rubber at the sides trimmed off, and placed in the vulcanizer. After curing, the plate is gradually cooled in the flask, suitably machined and polished.

Curing in Live Steam

Dental vulcanizers are miniature, self-contained, upright steam boilers; many used for single flasks are hardly a foot high by half a foot wide. Essential features are the gas burner (although some have kerosene or electric heaters), the pot or boiler of bare or heat-insulated copper, rust-proof steel, or bronze alloy, and the side-swinging or hinged lid to be clamped on the rubber gasket atop of the boiler. Gages automatically regulate gas supply and control steam pressure, and some have means by which an upward as well as a downward pressure can be exerted.



Davol Rubber Dental Dam

Atlantic Rubber Separator Strips

Steam is generated from water occupying about a third of the space in the boiler, and on a support just above the water level sets the flask with its plaster and rubber. While ordinarily live steam does the curing, the rubber may be vulcanized quite well in hot water. Steam is preferred on account of the greater compression obtainable. The gage is usually set to heat the water gradually from room temperature to 320° F. within 40 minutes, and such temperature is held for one hour for thin plates and reduced to 300° F. for about two hours for thick plates. It is said that even three hours at 290° are better for thick plates.

Compounds too quickly cured may not be of uniform density and may develop pores or blowholes. Many excellent light plates, however, are being made by good operators in somewhat less than an hour. One material used in such work contains an intimate mixture of powdered aluminum. It is said to facilitate thorough, uniform vulcanization owing to the metal particles forming a heat-conducting chain; and the product is said to be invariably non-porous and also exceptionally tough and capable of being highly burnished.

Hard Rubber's Unique Merits

Hard rubber as a material for dental plates was patented in England by Charles Goodyear, in 1855. Its immediate predecessor was gutta percha, introduced in England by Edward Trueman in 1851. Before that time artificial teeth were almost wholly fastened with metal. It was quickly found that nothing compared with rubber in affording adhesion and retention of plates because with vulcanite a matrix could be had giving every muscular-vascular detail of the palate, easily worked, and practically indestructible.

Even present-day substitutes lack vulcanite's perceptible resilience and a peculiar property of gradually conforming in the case of opposing plates and affording a fit even where exact molding had failed to achieve its purpose. Unlike many substitutes, it is perfectly tasteless. No material can be more easily and quickly repaired. Expert operators cite cases of rubber plates being patched and re-vulcanized even ten times without showing impairment.

S. S. White Dental Rubber Dam and Holder

S. S. White Dental Plaster Mixing Bowl

Repairing Vulcanite Plates

Broken vulcanite plates are reunited, cracks closed, and hollows filled with a vulcanizable gutta percha compound which fuses perfectly with the rubber. Unlike uncured base plate rubber, gutta percha can be had in but few shades, but this deficiency is seldom of consequence in mending. After well scraping the broken edges the plate to be fixed is set in plaster paste; and when the latter has hardened, the gutta compound, warmed to make it more plastic, is pressed into place and smoothed. With a complementary matrix the plate is then set in a flask, well compressed, and put into a vulcanizer. In about 20 minutes the steam reaches 320° F., and at this temperature curing proceeds for 30 minutes. Then follow cooling, trimming, and polishing. If time allows, a hard rubber repair compound may be used.

Soft Rubber Sundries

Soft rubber always has played, and evidently always will play, an important part in dental mechanics. There is nothing to take its place. It is indispensable for bags, tubing, and inhalators for the administration of anesthetic* and oxygen gases; for the bulbs of chip syringes used in removing drillings and fillings; for bowls in which plaster of paris is mixed for gum and palate impressions; for ligature rings in straightening teeth with an intermaxillary anchorage; for strips for separating teeth; for ribbed polishing points and cups set on mandrels, some of the hollow types being compounded with pumice; for bellows disks, hot air and abscess syringes; for apron-like throws; and for dental dam.

Dam rubber is an especially fine product. It is usually made in two shades. For producing the brown type pure up river fine Para is preferred; the wild Brazilian is prized for strength, toughness, and durability, holding up well even in the most tropical climates. A cream-colored type made of plantation rubber is strong and serviceable. All dam rubber is sheeted as thin, heavy thin, medium, and heavy. Such material is kept fresh if immersed in boiled water to which have been added a few drops of phenol or lysol. When needed for use, the sheeting is dried and rubbed with talcum.

Effect of Storage

on Milled Crude Rubber[1]

C. M. Carson[2]

OUR knowledge of cured rubber, aged for various periods of time, is fairly extensive. The fact that uncured rubber also undergoes certain changes, even over short storage periods ranging from a few hours to several days, is also known in a general way. It was considered interesting to study the effect of longer aging periods along this same line.

When plasticized or so-called broken-down rubber is not used within a reasonable period, it regains a certain amount of "nerve" and becomes more difficult to handle in ordinary factory processes.

This paper deals primarily with the effect of storage at different temperatures on milled crude rubber, in an attempt to translate the general term "nerve" into definite physical properties such as plasticity, modulus, and rate of cure. This investigation was conducted on a factory scale in order to permit comparisons between typical factory operations and these physical properties, and a total amount of 40,000 pounds of rubber was used.

The literature contains a number of articles dealing with changes taking place in rubber at certain definite temperatures. Among these is an article by Griffiths[3] appearing in 1926, in which he evaluated "nerve" in terms of extrusion plasticity. He showed that the plasticity figure did not increase for periods up to 30 hours after the rubber had been cooled below 55° C. He did not continue his experiment beyond 30 hours, and it is this longer period extending into months which the present paper attempts to cover.

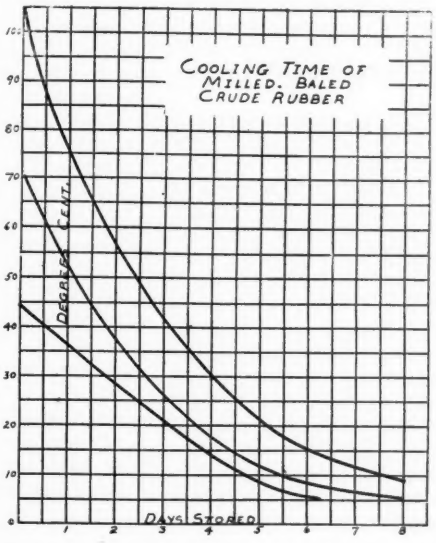


Fig. 1

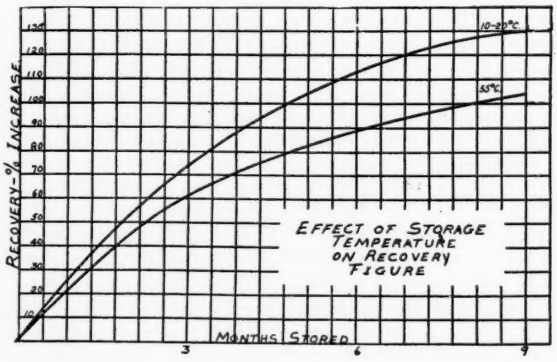


Fig. 2

Smoked sheets were milled under definite procedures to produce four different plasticity grades ranging from slightly to thoroughly plasticized rubber, and stored at two temperatures (10-20° C.) and at 55° C., for periods up to 9 months. For convenience in handling, the rubber was baled, 225 pounds per bale, using pressures of 60 to 70 pounds per square inch to exclude air; and in order not to overlook any effect of original temperature, the bales were prepared with rubber at three temperatures—43°, 72°, and 100° C.

Plasticity values are based on the Williams plastometer under the following testing conditions: a 1-cc. pellet, under 10 kg. pressure for 3 minutes at 70° C., the compressed height being expressed in millimeters times 100. The regain or recovery value is based on a 1-minute recovery expressed in the same way. The four plasticity groupings used in this work were 390, 350, 325, and 275. The first was obtained by one breakdown on an 84-inch mill, the second by one breakdown on a 60-inch mill set at a somewhat tighter gage, the third by remilling 390 rubber, and the fourth by remilling 325 rubber.

Results

The effect of storage is most noticeable in the recovery value with but

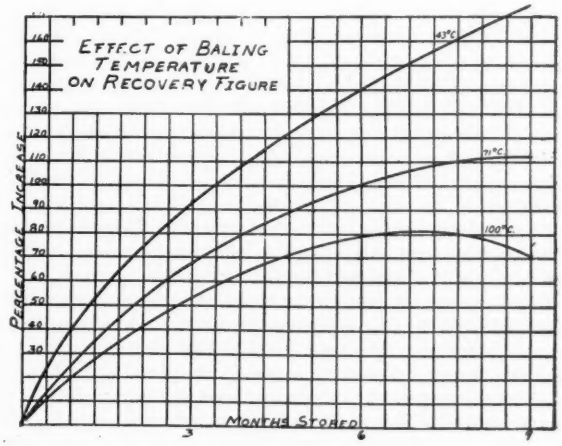


Fig. 3

[1]Presented before the meeting of the Akron Rubber Group of the A. C. S., Feb. 19, 1931. *Ind. Eng. Chem.*, June, 1931, pp. 691-92.
[2]The Goodyear Tire & Rubber Co., Akron, O.
[3]Griffiths, *Trans. Inst. Rubber Ind.*, 1, 308 (1926).

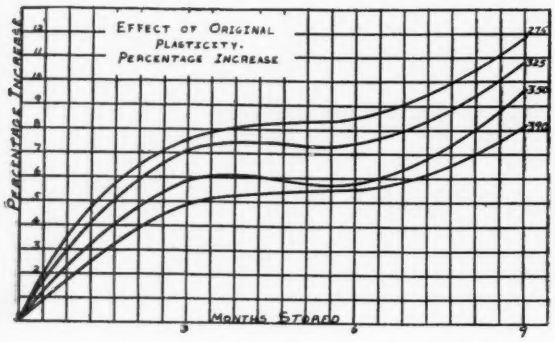


Fig. 4

slight change in the plasticity figure, except for the longest storage periods. The recovery value increases consistently under all conditions investigated up to 9 months, the greatest increase being with 275 plasticity rubber baled at 43° C., and stored at room temperature (10-20° C.). This increase is about 180 per cent of the original recovery figure. The least increase, 80 per cent, occurred with 390 rubber baled at 100° C. and stored at 55° C.

The modulus of the rubber showed a decided increase similar to that noted in recovery. However modulus was increased most by storage at 55° C.; whereas the plasticity and recovery figures had been increased most by storage at room temperature.

The change in rate of cure was usually one of gradual, but slight, increase: i. e., the best cure changed from 40 minutes at 126.5° to 35 minutes at 126.5° C.

Figure 1 is a cooling curve showing the time required by rubber, baled at different temperatures, to come to equilibrium. Measurements were made by thermocouples inserted in the rubber at the time the bales were prepared.

The increase in physical property values is shown in Figures 2 to 5.

Figure 2 shows the percentage increase in recovery due to storage temperature. The recovery value is used in preference to the plasticity increase since it was found to be a more definite and uniform figure. Storage at room temperature of 10-20° C. was found to give a gradually increasing recovery value, ending at 130 per cent in 9 months. Storage at 55° C. caused a smaller increase of 110 per cent in 9 months.

The effect of baling temperature is shown in Figure 3. Rubber baled at 43° C. increased in recovery to a figure 180 per cent higher than the original, in 9 months; while rubber baled at 100° C. showed a much smaller increase.

Figure 4 shows the effect of the original plasticity groupings in which the rubber had been divided. In this case the increase in plasticity value was plotted. As would be expected, the softest rubber showed the greatest increase, while the rubber which had been worked the least showed the smallest change. In general, the average plasticity increase was sufficient to place the rubber in the next higher plasticity group. Table I shows the percentage increase in plasticity.

The modulus changes were of a somewhat different nature. All samples were cured in the following formula: rubber 100, zinc oxide 4, sulphur 6, and captax 0.5.

The cure was 40 minutes at 126.5° C., the modulus being taken at 700 per cent elongation on the Goodyear autographic machine. The most marked effect is the increase in modulus shown by storage at 55° C. (Figure 5). Up to 6 months there was a consistent increase in modulus of samples stored either at room temperature or at 55° C. The last 3 months showed a still further increase in modulus of bales stored at 55° C., but not in those stored at 10-20° C.

Table I. Increase in Plasticity Values Due to Different Original and Storage Conditions

	3 Months %	6 Months %	9 Months %
Temperature Stored			
10-20° C.	6.8	6.1	13.7
55-60° C.	6.6	7.9	10.5
Temperature Baled			
40-45° C.	6.4	6.8	10.7
70-75° C.	7.6	7.3	12.1
Over 100° C.	4.9	6.6	8.3
Original Plasticity			
275	7.1	8.6	12.9
325	7.4	7.7	11.9
350	5.5	5.5	9.8
390	5.9	5.5	8.3

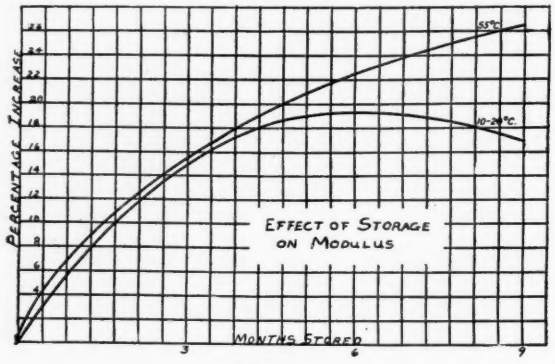


Fig. 5

It was impossible to get a complete range of cures on every sample, but this was obtained on every tenth sample. These results, taken in connection with the stress-strain curves and with hand tests, gave a comparison of rate of cure before and after aging. It was found that at 3 months 33 per cent of the samples had become faster curing than originally, at 6 months this percentage had increased to 45 per cent, and at 9 months to 50 per cent, with a corresponding decrease in samples showing a slower rate of cure.

The stress-strain curve showed a decided tendency to become steeper with increased aging time, which is an added indication of the faster rate of cure noted above.

Table II. Change in Shape of Stress-Strain Curves After Aging

	3 Months %	6 Months %	9 Months %
Flatter	14	2	6.5
Steeper	37	56	67.5
No change	49	42	26

Action of Aged Rubber in Factory Stocks

When compounded in regular factory stocks, the aged rubber was found to act practically the same as stocks containing freshly milled rubber, on mills and calenders. However in comparing regular factory runs of tube stock it was found that the former was much rougher, more porous, and slower tubing than the latter. The physical tests showed the Williams plasticity figure to be equal to or lower than in the freshly milled stock, indicating a smoother, faster tubing compound. The modulus figure was higher in the stock containing the aged rubber, it was also slower curing even though the rubber itself seemed to be faster curing. This is explained by the fact that the rubber used in the tube stock had been aged only 3 months or less and the trend toward faster rate of cure was not yet so noticeable.

Since rough tubing could not be explained by a slower curing stock and since higher modulus is not necessarily a cause of rough tubing, the question of the low Williams plasticity figure is interesting. It appears that the Williams machine, being a compression type plastometer, is entirely satisfactory as a gage of milling and calendering operations, but in dealing with a tubing machine it is necessary to use a different type, such as the extrusion plastometer, which approximates more nearly actual tubing principles. When samples of tube stock containing aged rubber were compared

with samples containing freshly milled rubber on an extrusion type plastometer, they were found to have a higher plasticity figure in the same degree as their action on the tubing machine would lead one to expect.

Age Tests on Aged Rubber

Samples of rubber from a number of bales were put up in the testing formula previously used.

Modulus tests were run on the fresh stock and on the same stock after 12-day oxygen and nitrogen aging. After 9 months' aging at –5.6° and at 55° C. the bales were resampled and retested both before and after 12 days' oxygen and nitrogen aging. The results were as follows:

1. The aged rubber conformed to the general average of all stored rubber: i. e., modulus and tensile were higher after storage than before. The rate of cure was somewhat faster.

2. Aged rubber after 12-day nitrogen bomb test in the testing formula was much poorer aging than the fresh rubber. In most cases the modulus and tensile were much higher and the cure faster in the stored rubber than in the fresh rubber. In three samples the stored rubber was completely ruined by the age test, whereas the same rubber when fresh had withstood this test.

3. The 12-day oxygen test was not so severe on the stored rubber as the nitrogen bomb had been. Nevertheless the samples were all inferior to the same rubber when fresh.

4. The logical conclusion to be drawn from this is that the natural antioxidant has been destroyed by storage.

Change in Chemical Properties of Aged Rubber

A change in chemical properties of rubber is sometimes an indication of the nature of physical changes taking place. Table III shows the chemical changes occurring in several bales.

TABLE III. CHEMICAL CHANGES IN RUBBER ON STORAGE FOR 9 MONTHS

	Acetone Extract		Alcoholic KOH Extract		Acid Number		N_2 in Acetone Extract		N_2 in Extracted Rubber	
Bale	Before %	After %	Before %	After %	Before	After	Before %	After %	Before %	After %
					Stored at –5.6° C.					
165	3.50	3.37	0.35	1.10	370	297	0.015	0.021	0.53	0.44
167	3.40	3.32	0.30	1.00	360	273	0.014	0.025	0.53	0.42
168	3.50	3.10	0.40	0.95	362	204	0.010	0.016	0.56	0.38
173	3.55	2.98	0.45	0.90	230	204	0.014	0.018	0.46	0.39
					Stored at 55° C.					
174	3.65	3.20	0.35	1.07	266	236	0.011	0.015	0.52	0.40
175	3.60	3.25	0.42	0.85	275	205	0.011	0.015	0.52	0.33
176	3.75	3.45	0.48	1.25	233	217	0.010	0.014	0.59	0.43

The effect of storage is exactly the opposite of the effect of heat on rubber[4] except in nitrogen distribution. In the latter case the acetone extract and acid number increased. The decreased acid number and acetone extract may be due to a polymerization of part of the fatty acids, making them acetone-insoluble. Weight is given to this theory by the increased alcoholic potassium hydroxide extract. Alcoholic potassium hydroxide would reverse the polymerization process and extract the fatty acids from the rubber. The fact that the alcoholic potassium hydroxide extract increased more than the acetone extract decreased may be explained by supposing that some other non-rubber constituents have been rendered soluble by aging. The change in nitrogen distribution is in line with what we would expect.

"Frozen" Rubber

Among the many peculiar properties of rubber, that of freezing and thawing has been little investigated, in spite of its presence, during at least a part of the year, in this climate. It is occasionally encountered in midsummer and in rubber shipped direct from the plantations. Van Rossem and Dekker[5], as a result of a study of frozen smoked sheets, advanced the theory that the cause of the frozen conditions was crystal growth. The density, hardness, and light absorption of frozen rubber at various low temperatures were suddenly decreased at about 36-38° C., indicating a melting of crystals. They evidently did not encounter frozen rubber of the type which has not been exposed to freezing temperature. Leblanc and Kröger[6] and Kröger[7] used sufficient pressure on rubber to cause a change of state (aggregation) which they regarded as analogous to the effect produced by cold and, in a way, resembling vulcanization.

Apparently milled rubber undergoes the same change as smoked sheets. Several bales of milled rubber were placed in a local ice plant at –5.6° C. and examined at various intervals during 38 weeks. The bales showed normal cooling curves and came to equilibrium in 4 to 6 days, depending upon their original temperature. When removed from the ice plant, the bales thawed in 5 to 7 days at room temperature varying from 15° to 30° C.

Frozen rubber, whether in sheet or milled form, assumes an opaque, creamy color and becomes very difficult to work. This condition may be either permanent or temporary. By the former is meant rubber which remains unworkable, boardy, and opaque at room temperature; and by the latter, rubber which will thaw at room temperature. Most frozen rubber is in the second class. Both usually have the same appearance although bales of smoked sheets may assume their natural brown color and still remain boardy. By cutting a sheet the opaque, creamy color will be seen on the freshly cut edge.

The thawing of frozen rubber is a very definite temperature effect. A single sheet of permanently frozen crude rubber will remain boardy for months at room temperature. If placed in an oven at 50° C., it will thaw in a few minutes. A piece of smoked sheet 3 inches square thaws in 2 minutes. Two adhering sheets, 3 by 3 inches thaw in 3 minutes; three sheets of the same size thaw in 4½ minutes. This can be carried on up to the dimensions of a bale, which thaws completely in 24 hours if not surrounded by other bales.

The thawing of temporarily frozen rubber is a different type of change. Simple exposure to a moderate room temperature will thaw sheets in a few minutes. The thawing of a bale is, of course, a longer process, but extreme temperature is not necessary except as a means of hastening heat transfer.

None of the baled, milled rubber was found to be permanently frozen, even after 38 weeks at –5.6° C. However a number of 1-pound samples which were deformed by a rubber-cutting machine and later stored under slight pressure for nearly a year at room temperature (5-35° C.) assumed the opaque, horny condition of permanently frozen smoked sheets and did not thaw out at room temperature. It would seem, therefore, that pressure is one cause of permanent freezing.

[4] Park, Carson, and Sebrell, *Ind. Eng. Chem.*, 20, 478 (1928).
[5] Rossem, van, and Dekker, *Kautschuk*, 5, No. 1, 2-5 (1929).
[6] Leblanc and Kröger, *Kolloid-Ztg.*, 37, 205-14 (1926).
[7] Kröger, *Gummi-Ztg.*, 40, 782-4 (1926).

Rubber Ship Fenders

A new type of all rubber built-up disk bow fenders for vessels has a soft steel casing, or stem pad, attached to lie between the stem iron of a vessel and the pudding, thus preventing the iron from cutting through the fender as sometimes happened while using the earlier models of rubber fenders. Roller bearing sectional disk fenders that hang horizontally are now used between ships moored abreast of each other. Each unit consists of six rolls of rubber material so grouped as to withstand compression and expansion without losing shape. The latter fenders, as well as all bow and stern fenders and chafing mats used around the vertical edges of landing floats, gangway landings, piling, dolphins, sea-walls, etc., are made from discarded automobile tires cut into various shapes and held together with special metallic devices.

EDITORIALS

When Our Cooperation Counts

THE widespread enthusiasm that greeted President Hoover's recent moratorium suggestion may have somewhat subsided, but still strong is the general conviction expressed when it was announced that a year's respite in the paying of war debts will be a world-wide boom. The proposal was not offered as a radical remedy for international ills but frankly as a palliative, and it must prove a much-needed measure of relief. Opportunely presented, it is no mere generous gesture but an offer in keeping with the nation's finest traditions of altruism and magnanimity.

Trade everywhere needed just some such fillip. Already business morale here and abroad has been strengthened prodigiously by the American overture, and there is every reason to believe that with even the temporary banishment of the post-war financial incubus enterprise in all lands will continue to assume a more confident tone and gladness soon replace gloom.

The bringing about of normalcy is, of course, the appointed task of no particular political, industrial, or financial group or groups; it is a job in which we all must help heartily. We can not think that we may now idly drift along chanting, "Happy Days Are Here Again;" we must do our share toward bringing them back. It is incumbent on all of us to add to the impetus given by the Chief Executive, to redouble our efforts, and to conduct our various affairs that good times will not only soon return but will long abide with us.

Advisability of Wage Reduction

NO SUBJECT of late for the relief of manufacturing conditions has been more keenly debated than that of downward revision of the wage scale. Some large concerns, feeling that the lowered cost of living and the difficulty of paying dividends justify them in expecting workers to share with stockholders the downs as well as the ups of business, have already taken the bull by the horns in decreeing wage cuts of 10 per cent and more. The alternative they say would be to reduce the working force, a greater hardship; and it might be difficult later to reassemble trained workers. Moreover the idea of adding to unemployment is repugnant. Too many are out of work now. Hence has the compromise suggestion been urged that until times improve it would be better to pay wages of $46,000,000 to 45,000,000 ordinarily employed than to about 40,000,000 still at work. This system means less pay per person, but less idleness.

Despite cheaper raw materials and all the economies effected in production, wages still feature largely in factory cost, in rubber manufacturing alone being estimated at from 28 to 35 per cent. Until greater efficiency can reduce such ratio, or until makers' prices can be safely advanced, many manufacturers consider wage reduction as a necessary recourse and a reasonable readjustment policy.

Opinions vary widely on the ethics and wisdom of wage reduction. President Hoover and many leading American industrialists are quoted in favor of keeping the high wage scale as essential for the high standard of living. If the lowering of wages became a general policy, it is held, it might retard the return of prosperity by fostering excess frugality and by reducing individual buying power, might lead to labor disturbances when prices advance and wages are not raised correspondingly, and might even incite agitation for nationalization of industries when there is already too much politics in business and too strong a trend toward higher taxes and government paternalism.

Railroad and Rubber Mergers

THE American railroad companies planning a merger into four great systems to insure net earnings of at least 5½ per cent have seemingly lost interest in the scheme; instead they are pressing the government for an increase in freight rates. A short time ago much was heard about a possible combination of five leading tire companies aiming to average as much net profit as the railroads sought. But, while the profit need is as strong as ever, enthusiasm over such a trade alliance seems to have petered out, and no substitute plan has been offered for insuring uniformly reasonable returns on the vast sum invested in tire making. Yet a "gentlemen's agreement" among tire makers, faithfully observed, might do wonders in reviving and stabilizing the entire rubber industry.

Reclaimers' Task Harder

IN THE increasing use of powerful and continuous accelerators some technicians see increasing difficulty for makers of reclaimed rubber. Manufacturers of rubber goods vie with one another in producing compounds affording the utmost resistance to heat, and then reclaimers are expected to break down these vulcanizates of steadily rising heat resistance and to provide regenerated rubber of constantly improving quality. Many marvel that reclaimers are able even to maintain their products at the present high standard, much less still further to improve properties, under such a peculiar handicap.

What the Rubber Chemists Are Doing

Rubber-Asphalt Compositions[1]

F. C. Van Heurn and M. A. Begheyn[2]

THE principle upon which this method of determination is founded is that sulphur at about 150° C. rapidly acts upon rubber, vulcanized rubber being formed first, and finally ebonite, if sufficient sulphur is present. Sulphur only begins to react noticeably with asphalt at about 175° C. The product of the final reaction of sulphur with rubber in the presence of excess sulphur is insoluble in organic solvents. At a temperature ranging from 140° to 160° C. it is possible to transform the rubber into an insoluble condition and then to separate it by extraction from the unchanged or only very slightly changed asphalt. The sulphur in the resultant ebonite must then be determined, after which the rubber content can be calculated.

Procedure

Weigh off about 2.5 g. of the material to be examined—or as many g. as are estimated to contain 50-100 mg. of rubber—in an alundum extraction thimble, and extract for about eight hours with xylene in an extraction apparatus. If abnormal quantities of material are under examination, as, for instance, when there is only very little rubber, extraction may be carried out in the alundum thimble in portions. Heating in a pyrex tube (as described later) can then be substituted by heating in a porcelain crucible. If there is an excessive quantity of rubber, for example, more than 15 per cent, it is desirable that the material be diluted with asphalt until there is about 2.5 per cent of rubber calculated on the mixture, in view of ebonite extraction to be made later.

So far as possible the xylene should be evaporated off the extract in a weighed beaker glass and the beaker glass then reweighed. Transfer most of the residue to a pyrex tube and heat it at 160° C. for four to five hours in a drying oven with 200 per cent by weight, hence, in this case, five g. of sulphur. Should hydrogen sulphide be developed at this temperature, operations must be carried out at a lower temperature and a proportionately longer period allowed for the sulphur to act.

During the process of heating, stir the mixture with a small rod a moment every hour. When cooled, tube and rod are placed upside down in a weighed alundum thimble and extracted with xylene, slowly at first and then more rapidly, in an extraction apparatus. When the xylene runs off clear, free the glass tube and rod of any ebonite still adhering and return them to the alundum thimble. Continue to extract briefly; afterward drying and weighing the thimble at 150° C. The sulphur content of the insoluble residue, which can easily be removed from the thimble (this would not be the case with a Gooch crucible with asbestos fibers), is now thus determined in the following manner:

Place 100 mg. in a 500-cc. pyrex round-bottomed flask, to which add 10 cc. of a solution containing one litre of nitric acid (sp. gr. 1.4) and 200 g. of zinc oxide, afterward saturated with bromine. After shaking gently, let the mass stand for a few hours. Then add 15 cc. of fuming nitric acid, turn the flask up quickly, and, after complete solution, add 5 cc. of bromine water. Now concentrate to the consistency of a syrup, and, if any organic particles still remain, add a few cc. of fuming nitric acid and again concentrate.

After the substance has cooled, add a few crystals of potassium chlorate and heat the flask, while shaking, on the exposed flame until the liquid has evaporated and no further nitrous vapors rise. Absorb the residue in hydrochloric acid while gently heating. Six to seven cc. of concentrated hydrochloric acid (sp. gr. 1.19) is sufficient for the purpose and, after evaporation with water, filter. The sulphur should be determined in the filtrate as barium sulphate.

These directions for the sulphur determination have been taken from the survey of the principal methods used by the Netherlands Government Rubber Experimental Station at Delft, with supplements.[3] It is obvious that a blank sulphur determination must be made in the chemicals and the final figure deducted from the quantity of sulphur found.

If the percentage of impure ebonite found amounts to a percent of the material under examination, and if the sulphur content of that ebonite is b per cent, then the rubber content of the base material is:

$$\frac{68}{100} \times \frac{b}{32} \times a = 0.02125\ ab.\ \text{per cent.}$$

Should a glass extraction apparatus not be available, an American extraction apparatus may be used. The disadvantage of the latter, however, is that the metal cooling coil becomes corroded by the sulphur vapors during extraction.

When using this analytical method it is necessary that one should first of all ascertain whether the mixture of asphalt and rubber to be examined is soluble in xylene. If this does not prove to be entirely the case, only that part which is soluble in xylene can be analyzed.

In technical mixtures containing, for instance, much rubber and little asphalt, one may quite conceivably find that not everything goes into solution in xylene. In that event the present method will not suffice; one would have to apply it to the extract and combine the result with that of a further chemical analysis of that part which did not dissolve in xylene.

Such difficulties will not occur in the investigations which interest us most and which are concerned with fairly simple mixtures of asphalt and rubber. But there will also be many technical rubber mixtures which can be analyzed by our method without difficulty. We have, for instance, discovered that after the extraction for one day of inner bicycle tires cut up into small pieces, with xylene, there is a residue of only 0.8 per cent of insoluble substances.

The majority of vulcanized rubbers, with the exception of ebonite-like products, will easily dissolve in hot xylene. After having thus brought the rubber into solution, the major part of the xylene is evaporated, and examination is continued, as described, with a known quantity of the residue.

[1] "Identifying Rubber Quantitatively in Compositions of Rubber and Asphalt." *India Rubber J.*, June 27, 1931, pp. 847-51.

[2] Amsterdam Laboratory of the Bataafsche Petroleum Mij., The Hague, Holland.

[3] *Bulletin*, 3rd series, 1921, No. 6.

Manganese in Raw Rubber[1]

THE proposed use of a certain proprietary fungicide solution containing potassium permanganate led to the examination of samples to determine the effect of adding manganese above that normally present in first grade plantation sheet and crepe and well-prepared lower grades.

The fungicide contained a quantity of suspended matter which was filtered off. The filtrate contained 0.20 g. potassium permanganate per 100 cc., and the unfiltered fungicide 0.94 g. per 100 cc.

When used in the proportions of 1 ounce to 1 gallon of pure latex, the fungicide caused no appreciable difference in tackiness compared to rubber prepared without it; but larger amounts developed increased stickiness. The rate of vulcanization was retarded by adding the permanganate.

These results indicate that treatment of latex or raw rubber with potassium permanganate cannot be recommended.

[1] R. O. Bishop and K. C. Sekar, *Quarterly J. R. Inst. of Malaya*, Apr., 1931, pp. 239-45.

Permeability of Rubber to Air II[1]

V. N. Morris[2]

IN THIS paper the author discusses the effect of stretch, thickness, milling, compounding ingredients, kind of crude rubber, and temperature of vulcanization. His summary and practical conclusions are as follows:

Summary and Practical Conclusions

The permeability of rubber membranes was found to be approximately inversely proportional to thickness. The recently developed "super" automobile inner tubes are therefore undoubtedly better air containers than the ordinary tubes of smaller gage.

Most of the increase in permeability resulting from stretch can be accounted for by the decrease in thickness accompanying stretch.

Pure-gum stocks made from various commonly used plantation rubbers did not vary much in permeability. A stock made from a wild rubber, caucho ball, had a somewhat lower permeability.

Milling on a steam-heated mill was found not to change permeability appreciably. The early stages of milling on a cold mill reduced the permeability of a stock slightly.

The temperature of vulcanization seemed to have no influence on permeability, provided the test slabs were cured to the same state. It may be concluded, therefore, that the recent trend toward higher temperatures of cure for inner tubes has not adversely affected their air-retaining capacities.

None of the various softeners or other organic materials tried was found to effect any appreciable decrease in the permeability of a rubber stock.

The results indicate that permeability is roughly proportional to the volume of rubber hydrocarbon present in a stock. The nature of the principal compounding ingredient used in a stock, however, does have some influence on permeability. Clay, channel black, and blanc fixe are among the compounding ingredients having the most beneficial influence on permeability.

Experiments with stocks containing various quantities of zinc oxide indicate that permeability varies inversely with the volume of pigment present. From the standpoint of the air-retaining capacity, the loading of inner-tube stocks with pigments is therefore desirable.

[1] Presented before the Division of Rubber Chemistry at the 81st meeting of the A. C. S., Indianapolis, Ind., March 30 to Apr. 3, 1931. *Ind. Eng. Chem.*, July, 1931.

[2] Firestone Tire & Rubber Co., Akron, O.

Evaluation of Spent R 2 and Pipsol X

AFTER the utilization of R 2, R 2 base, Pipsol X, or Pipsol X emulsions it is often necessary to determine the quantity of active principle remaining. To accomplish this determination the following method has been devised, which depends upon the idea that the active principle is an unsaturated chemical which absorbs iodine under conditions which do not give iodine to the other constituents of these products. It must always be remembered that the use of other chemicals with these accelerators brings in the possibility of giving high results, but the foreign materials ordinarily encountered, such as ammonia, soaps, oleic acid, etc., do not affect this test.

Apparatus

1—50 cc. straight stopcock burette reading to 1/10 cc. graduations.

1—White spot plate, porcelain with about twelve cavities.

1—250 cc. pear shaped separatory funnel.

1—100 cc. volumetric pipette.

1—Eyedropper.

1—100 cc. graduated cylinder.

Several 150 cc. glass beakers.

1—1 liter glass stoppered bottle for iodine solution.

Glass stirring rods.

Solutions

1. Tenth normal solution of iodine in benzol. This solution is prepared by accurately weighing out 12.69 gr. of iodine crystals and dissolving them by shaking in one liter of good grade benzol. In case the results are compared with an analysis of the original material by means of the same iodine solution, the accurate weighing of the iodine is not necessary.

2. Starch solution. Boil 10 gr., approximately, of starch with a liter of water for 10 minutes. Allow to settle overnight, and use the opaque non-gelatinous upper liquor for indicator in the tests below.

3. Benzol supply of several liters of good quality.

R 2 Accelerator

Since the curing value is not directly connected with the iodine titration, although it usually conforms pretty closely, the accelerator should be tested before and after use in the manner described for the material under test. Weigh a one and a half gr. sample of the R 2 under test into a clean 150 cc. beaker. Add 20 cc. of benzol from the graduate. Stir until it is in solution. In case regular R 2, freshly purchased is used, with accurately prepared iodine it is safe to run 25 cc. of the iodine solution into the sample from the burette.

Then fill the cavities on the spot plate with 2 drops of the starch solution, freshly prepared. Add a drop of the benzol solution from the sample solution in the beaker to the starch solution in one of the cavities on the spot plate. If no bluish or dark colored line or coloration appears in the starch from contact with the sample, add one more cc. of the iodine solution from the burette to the sample in the beaker. Stir vigorously and test again.

When almost enough iodine has been added to the sample a dark colored line and a blue coloration will appear in the starch droplet. Without adding more iodine to the sample, stir it vigorously with a stirring rod for 2 minutes and again test a drop on the spot plate. If no dark line or coloration appears in 15 seconds, add ½ cc. more of the iodine from the burette and again stir for 2 minutes and test. The number of cc. of 10/N iodine solution in benzol, which after 2 minutes of stirring with the sample, will give a distinct dark line within 15 seconds on the spot plate, is the iodine value of the materials.

If the iodine value of the R 2 used is 35 cc. originally, and after much use the same quantity of R 2 requires only 14 cc., it can be estimated that all of the R 2 except 14/35ths, or 40 per cent of the original material, has been used up.

Pipsol X

The procedure for Pipsol X, not in emulsion, is the same as under R 2 accelerator except that 1 gr. instead of a gram and a half will constitute a sample. Also, the initial addition of the iodine in benzol is usually about 25 cc. instead of the 20 cc. in the case of R 2.

For testing Pipsol X in emulsion with or without ammonia a quantity of the emulsion should be used which will contain approximately 1 gr. of the Pipsol X. Thus if a 1 per cent emulsion is made up, a sample consisting of 100 cc. should be pipetted from the emulsion. This is placed in the separatory funnel, and 30 cc. of benzol are added. It is carefully shaken for 2 minutes with the sample, and the benzol layer containing the extracted accelerator is drawn off and placed in a 150 cc. beaker. The water or emulsion layer is again extracted with 30 cc. of additional benzol. It is shaken for two minutes, and this benzol layer is added to the benzol in the beaker. If freshly prepared unused Pipsol X has been made into the emulsion, an initial addition of 20 cc. of the iodine solution from the burette is used. Otherwise the titration value will depend entirely upon the amount of use the Pipsol emulsion has had, and may require as little as 1 or 2 cc. The residual accelerator percentage is obtained by dividing the iodine value of the spent material by its original iodine value and then by multiplying by 100.

In the case of gasoline solutions of R 2, it is possible to titrate the equivalent of a 1½ gr. sample of R 2 in the gasoline with the iodine solution in benzol. The gasoline takes the place of the benzol for dissolving the sample very nicely.

The German Rubber Association

Abstracts of Papers Read at the Fifth Annual Meeting of the Deutsche Kautschuk Gesellschaft (German Rubber Society) Held at Eisenach, Germany, May 14-16, 1931

An Example of the Scientific and Economical Preparation of Smoked Plantation Rubber. By N. H. Van Harpen. In the preparation of plantation rubber the duration of the drying period is of great importance. Smoked sheet usually requires from 5 to 15 days, and air-dried crepe 10 to 20 days for drying. Van Harpen undertook to discover whether by shortening the drying period and lowering the drying temperature, the quality of the rubber could be improved, so he carried out tests with smoked sheets in which only the thickness of the sheets varied. The mathematical relations derived from this demonstrated the advantages of rolling the rubber as thin as possible in shortening the drying period and further showed that costs for drying establishments decrease approximately in proportion to the square of the thickness of the sheet. While thinner sheets mean a larger surface and require more space and more time for rolling, the advantages appear to outweigh these drawbacks.

In preparing the thin rubber the coagulum should be as soft as possible. This condition is effected by shortening the time of coagulation and adding sodium silico-fluoride. The coagulum is rolled out to a thickness of 1.5-2 mm. and imprinted by special engraved rolls. The rubber not only dries quickly but also shows a favorable rate of cure and good physical properties.

In reply to a question Mr. Van Harpen stated that this rubber was slightly better than normal sheet and crepe as regards technical uniformity.

On the Polymorphy of the Gutta Percha Hydro-carbon. By G. von Susich. Up to the present the α-β conversion of gutta percha and balata has only been approximately determined by X-rays, and little is known concerning the effect of impurities on melting and conversion points, rate of conversion, and the stretching process. The author and E. A. Hauser have carried out a number of X-ray experiments which show that the conversion point in a variety of samples of balata and gutta percha lies between 65° and 75°C; while the melting point lies between 60° and 65°C. Impurities in the crude products had little effect on either the melting or the conversion points.

Further investigations on purified Tjipetir gutta percha confirmed the supposition that in the behavior of gutta percha we have to deal with a polymorphy with monotropic conversion point. Conversion sets in at 68° C; the melting point of the α-modifications lies between 64° and 66° C; and of the β-modifications between 55° and 57° C. It may be assumed with certainty that these represent polymorphous modifications and not chemical isomers.

Comparison of the stretching process in gutta percha as shown by X-rays, with that of rubber, disclosed fundamental differences. The speaker pointed out various inconsistencies in the article by Stillwell and Clark on X-ray studies of gutta percha and balata[1].

Mr. Hauser pointed out the difficulty of accurate experiments in this field and warned against the formation of too far-reaching conclusions.

Two Years in the Rubber Territory of British Malaya and Netherlands Indies. By P. Scholz. A film was presented showing in Part I, the production of Revertex; Part II, a native festival; Part III, land and people including scenes of the cultivation of various tropical crops besides rubber; and Part IV, return voyage via America. By way of introduction the lecturer spoke briefly of his scientific investigations on the chemistry of latex which he conducted on various estates in the East and which concerned: the measurement of the surface tension of fresh latex and its relation to the non-crepe constituents; two new methods of determining the dry and crepe content of latex[2]; and finally, several hundred parallel determinations of the dry substance and the crepe content of various fresh latices from individual trees and groups of trees were made in order to study the absolute and relative proportion of the non-crepe constituents in latex on the basis of their percentage differences. In the latter connection a number of irregularities were observed.

Vulcanization with Benzoyl Peroxide. By A. van Rossem. No further details regarding vulcanization with benzoyl peroxide have been published since the first communication by Ostromislensky and nothing is known yet concerning the mechanism of this kind of vulcanization.

Mr. van Rossem studied the effect of time, percentage of benzoyl peroxide and temperature on the vulcanization of a mixing composed of rubber and benzoyl peroxide only, and found that the time had very little influence on the final product and that the modulus in these vulcanizates mounts very steeply. Very little difference was noted in the effect of addition of 10 or 20 parts of benzoyl peroxide, while even with 50 per cent hard rubber could not be obtained. In these vulcanizates tiny crystals, which prove to be benzoic acid, are visible, and altogether about 6 and 12 per cent can be extracted (with acetone first and then with alcoholic potash) in vulcanizates containing 10 and 20 parts of benzoyl peroxide respectively.

The hydrogen atoms forming the benzoic acid are derived from the rubber hydrocarbon so that dehydrogenation takes place.

Incidentally, unlike Boggs and Blake, the speaker found that heat developed during sulphur cure and also in benzoyl peroxide vulcanization. The author advises the greatest caution in making use of colorimetric data. Vulcanization, first with benzoyl peroxide, continued with sulphur, resulted in unusual acceleration.

Some Contributions to the Chemistry of Rubber. By R. Pummerer. In order to decide whether the double bonds are uniform or not, the fractionation of rubber was continued, and the reaction with free rhodanium was studied. The reaction is best observed with rubber in tetrachloride of carbon with an excess of rhodanium of 50 to 100 per cent. The end of the reaction is revealed in a congealing of the mass to a jelly and can only be observed in serial tests. The method is not very positive since the reaction of rhodanium still continues slowly, but a gradation of the double bonds could not be observed. The course of the reaction was quite normal. The resulting rhodanium rubber, precipitated with petroleum ether, is an orange powder in general corresponding to the formula $[C_5H_8(SCN)_2]x$, but also occasionally, for no apparent reason, containing oxygen.

Next the titration of rubber with chloride of iodine in chloroform or in chloroform plus tetrachloride of carbon was studied. The use of 110-120 per cent of chloride of iodine proved most suitable. The chloride of iodine titer of gel rubber was found to be somewhat smaller than that of the sol rubber which was very close to 100.

Finally experiments were made in ozone disintegration of rubber. Pummerer succeeded in isolating 90 per cent of the disintegrated levulin skeleton, including about 1-2 per cent carbonic acid, 1-2 per cent formic acid, and at least 2 per cent acetic acid. Traces of acetone, probably derived from impurities, were found in the first and the second frac-

[1] India Rubber World, June 1, 1931, pp. 61-62.
[2] *Ibid.*, p. 71.

tions of sol rubber, and in the levulinaldehyde, a slight amount of pyro-racemic acid. The origin of the latter and of the acetic acid has yet to be determined.

New Condensation Products of Rubber Hydrocarbons with the Aid of Benzoyl Chloride. By F. Kirchhof. The speaker obtained new condensation products, which he calls aryl-cyclo-rubbers (benzylid rubbers), by applying the Friedel-Crafts reaction to rubber hydrocarbons. The products are white to yellow, amorphous, slightly thermoplastic bodies, which contain, besides carbon and hydrogen, very small quantities of organically combined chlorine and resemble the already known body of the empiric formula (C_7H_6) x in their chemical and physical behavior.

Their specific gravity is about 1.1; they can hardly be made to swell, are almost insoluble and fairly indifferent to halogen and oxygen. Treatment with bromine-tetra-chloride of carbon solutions results in bromine substitution with slow development of hydro-bromine.

The benzylid rubbers, unlike the Bruson cyclo-rubbers, are hardly discolored by sulphuric acid, even at boiling temperature. Regarding their constitution, it is assumed that from the benzoyl chloride and aluminum chloride, dibenzylchloride develops, which seems capable of further analogous condensation.

Recent Developments in the Field of Microscopy and Their Technical Application Especially in Connection with Rubber. By E. A. Hauser. Microscopic examination in the rubber industry has so far played an insignificant part because the specimens require special preparation to obtain perfect images; while samples containing light-absorbing fillers give imperfect results. Therefore the use of microscopes such as are customary in the microscopy of metal has been experimented with, but only in the last few months have two microscopes of this type appeared on the market, which can be used without limiting the dimensions of the preparations. One, by the Busch firm, however, has the disadvantage that the surface of the sample must be comparatively smooth; the other, by the Leitz firm, on the other hand, is peculiarly adapted for work in rubber goods factories because any type of surface can be examined; while in addition ultra-microscopic examinations of colloid solutions, etc., can be carried out with it just as it is.

Vulcanization Problems. Much interest was shown in E. A. Hauser's communication regarding the accelerator-activator Barak. A mixing consisting of 100 rubber, 0.1 sulphur, 0.1 accelerator, and 0.9 Barak was cured in 10 minutes at 3 atmospheres. It was empnasized that without the addition of the slight amount of sulphur, that is 0.1 per cent, no vulcanization took place.

This information called forth a discussion of the vulcanization problem which H. Loewen said was not fundamentally altered by the experience with Barak. Mr. Pummerer suggested making titration and ozonizing tests with Barak vulcanizates in order to obtain some light on the question. Mr. Kirchhof pointed out the analogy of Barak and activation with benzidine, lead-superoxide, zinc-superoxide, and benzoyl-superoxide and thought the question was probably only one of activation of double bonds besides polymerization. Mr. Van Rossem considered that in the effect of Barak, as of benzoyl peroxide, we have to deal with a bridge-formation.

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Technical Communications

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Ulto Accelerator

ULTO accelerator has been developed for producing very rapid cures at low temperatures. The benefits of such cures with references to high tensiles, good aging, and the conservation of colors are well known. Ulto is a zinc salt of a complex di-thio-carbamate. It is a finely divided cream colored powder with a specific gravity of about 1.50. In it are combined the good qualities of SPDX with entire freedom from discoloration; therefore it may be used with pure white or pastel colors.

Like SPDX it is a fugitive accelerator in that it exhibits no detrimental after cure and, consequently, has excellent aging properties. It is non-migratory and does not bloom to the surface. As an ultra-accelerator it must be handled with care, using Revertex in connection with it to avoid prevulcanization.

Ulto disperses readily but owing to its activity in small amounts it is preferable to use 15 to 25 per cent master batches. In general practice the sulphur required is from 2 to 3 per cent.

At temperatures above 260° F. it is preferable to use 2.5 to 3 per cent of sulphur with Ulto although with highly compounded stocks at elevated temperatures much less sulphur can be used. At 212° F. the percentage of sulphur can be reduced to 2 per cent and still produce very high tensiles.

Quick curing cements at low temperatures and pure gum or compounded stocks are cured with equal ease. Stearic acid has practically no effect upon Ulto. Data from The C. P. Hall Co., Akron, O.

Dispersion Tests

VARIOUS manufacturers have their favorite dispersion tests but one very simple, quick, and fairly satisfactory test is the gloss or shine of the cut section of the uncured mix. This test should, and can be, very quickly made on several parts of every batch, the thought being that one should be prepared for occasional batches that show slightly inferior gloss after standard treatment. In such cases a passage through the refiners or remilling after a day or two of resting will generally suffice. The point it is desired to make is that no manufacturer, and in particular no tire manufacturer, should expect his mixing procedure to function without supervision. The presence of a laboratory representative in the mixing room at practically all times is recommended. The reward of such vigilance will be a satisfactory product. Data from Binney & Smith Co., 41 E. 42nd St., New York, N. Y.

Wire Cloth Space and Mesh

THE term "space" as applied to wire cloth means the clear opening or inside distance between parallel wires. The term "mesh" as applied to wire cloth means the number of openings in either direction per linear inch measured from center to center of parallel wires.

After deciding upon the space and the diameter of the wire the mesh of wire cloth is computed by adding the two together and dividing into unity. For example if the diameter of the wire is .047 inches and the space is .036 inches, the total of the two is .083 inches. This divided into 1 results in 12, which is the mesh, or in other words, the number of spaces in one linear inch of the cloth.

To determine the wire diameter use a micrometer caliper and measure both the warp and the shoot wires.

Space is tested by means of a powerful magnifying glass and measuring the wires in both directions. If square mesh, the space should be the same both ways.

The mesh is tested by measuring off one square inch of cloth; then by using a magnifying glass count the number of open spaces in each direction from center to center of the wires. Data from Newark Wire Cloth Co., Newark, N. J.

Scrap Drying and Reclaim Quality

A RECENT study, "Effect of Scrap Drying Temperature on the Quality of Reclaimed Rubber," (*Ind. Eng. Chem.*, July, 1931) is summarized in the following:

Devulcanized tube and whole tire scraps were subjected to temperatures of 126.7° C. and 135° C., respectively, and dried to a final moisture content of 2 per cent preparatory to processing into finished reclaimed rubber.

With increase in drying temperature the acetone extract remains unchanged while chloroform extract increases. With the higher temperatures the reclaims show a progressive increase in softness and tackiness, the highest temperatures used appearing to be the practical top limit for ease of processing. Compounds containing approximately 35 per cent reclaim show no detrimental normal or aged stress-strain characteristics.

A maximum ultimate drying temperature of 121.1° C. to a minimum moisture content of 3 per cent is suggested for all standard types of devulcanized rubber scrap, with the recommendation that much lower ultimate drying temperatures be maintained and that more rapid drying be promoted by the use of higher temperatures in the wet end of the drier.

Hakuenka

INFORMATION comes from Japan of native whiting so processed that it possesses marked reenforcing value in rubber compounding. This product, known as Hakuenka, signifying "white glossy flower," is substantially μ-calcium carbonate, very unstable under ordinary conditions but well stabilized by special processing. Its colloidal particle and great wetting power impart to it remarkable reenforcing action. The material is prepared in eight different grades or characteristic groups for availability under various compounding conditions. The remarkable dispersive ability of the A brands of Hakuenka adapted for tire and footwear manufacture is shown in the following range of their particle size content.

Microns	Per Cent
Above 2	None
2 to 1	12.41
1 to .5	28.66
.5 to .3	59.47
Below .3	9.46

As a rubber compounding ingredient, Hakuenka compared with ordinary calcium carbonate gives a much higher tensile, greater acid-resisting power, and mixes easier on the mill.

Compared with carbon black it does not adsorb air and cause interior oxidation. Its thermal conductivity is much less than that of carbon black and it has full range of use with all colors. It is weak in covering power; therefore, the tone of added colors are never changed or faded. Data from Shiraishi Kogyo Kaisha, Ltd., Tokyo and Osaka, Japan.

Carbon Black Test

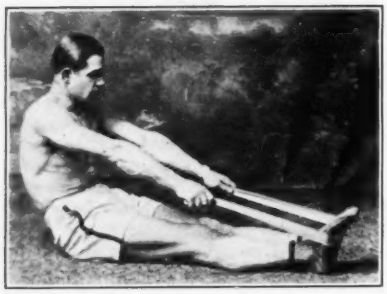
IN A recently published paper[1], Wiegand and Snyder give the following quality test for carbon black measured in terms of adsorption of DPG removed.

Two grams of C.P. diphenylguanidine are dissolved in one litre of ethyl alcohol (U. S. No. 1 denatured has been successfully used). Fifty ccs. of this are shaken with one gram of the sample for two hours. It is then filtered, and 25 cc. of the filtrate titrated with .01 normal hydrochloric acid using a mixture of bromphenol blue and methyl red. The result is expressed as the percentage of DPG removed.

A review of many duplicate tests shows a mean deviation of well under 5 per cent. This indicates a probable error distinctly lower than the variability due to differences in quality. In other words, the test is satisfactory as regards chemical accuracy.

[1] "Some Properties of Carbon Black I—Adsorption." Paper presented to American Chemical Society, Indianapolis, Ind., April, 1931.

New Goods and Specialties



Poulos' Body Builder

Rubber Exerciser and Body Builder

ANOTHER exerciser designed to build a powerful body for the user and to help him acquire health and proper symmetry has made its appearance. This all-rubber device of pure gum, said to build vigor, grace, and posture for everyone, has been patented by Sergeant Frank Poulos, well-known athletic director, and is made for him by The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J. With this exerciser, a wide, long rubber strip, comes a broadside giving numerous directions for its use. This body builder, here illustrated, is made in several weights: in one size for women and in light, medium, light heavy, and heavy weights for men.

Oil Suction and Discharge Hose

THE severity of service imposed upon oil suction and discharge hose calls for special quality materials and construction adapted to withstand deterioration and abuse. The picture represents several important departures from the usual smooth bore oil suction hose construction. Its make-up from the interior outward embodies the following features:

First comes a spiral of half oval steel wire spaced ¾-inch. This is covered with 2 plies of strong bias cut fabric conforming snugly to the corrugated contour of the wire spiral. Next a 1-inch duck strip is applied following the helical wire spacing. Here it functions to bind the under fabric plies in place, assists to exclude oil from the rubber tube, and has independent freedom of movement without any strain when the hose is flexed. The rubber tube is heavy uniform gage and strongly resistant to oil. Over the tube, plies of special strong bias cut duck form the main fabric support of the hose structure to withstand heavy pressures and sharp bends. An intermediate layer of rubber of the same oil resisting stock as the first tube acts to cushion the main fabric body and the spiral oval steel wire that encircles the hose immediately over the spacing of the inner wire spiral. This outer spiral is covered with a single ply of fabric which is still further bound and held in position by a 1-inch wide strip of duck wound in the spacing interval of the spiral. Finally the hose is encased in a rubber cover resistant to oil and gasoline, which also protects the under structure from atmospheric oxidation and prevents contact of the outer steel coil that might cause sparking when the hose is dragged over sharp edges on the dock or on the steel deck of the ship. Atlas Rubber Co., 149 Broadway, New York, N. Y.

Real Service Suction Hose

Air Raft or Mattress

TO THE beach habitué Converse-Hodgman, Malden, Mass., introduces Funflote, an air raft or mattress which can be used on land or in the water. In the water it serves as a raft. The manufacturer claims it has an unusual amount of buoyancy and easily supports two or three adults at one time. It can be used at beach, lake, river, or pool, and provides unlimited fun for all informal water sports. After the swimming, bathing, and water activities are over the mattress can be tossed onto the beach or shore. It dries out completely in a few minutes and can be used for lounging and resting.

This air raft has a colorful, attractive awning duck on top and a green drill bottom. It measures 30 by 72 inches and has the same construction as the Converse "Camplite" air bed. A large eyelet at each corner makes it easy to string rope which serves as a hand hold. When deflated, the Funflote rolls into convenient carrying size.

Its uses are almost unlimited. While it is primarily intended for water sports of all kinds and shore lounging, it is just as practical as a camp bed and can also be used in steamer and porch chairs, for an auxiliary bed in the summer home or camp, and in dozens of other ways.

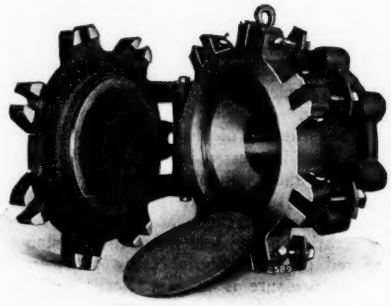
Rope-Soled Footwear

FROM the Alfred Hale Rubber Co., North Quincy, Mass., comes news of canvas shoes with rope soles. These shoes, made in oxford style in all white or white with a colored saddle, have a canvas upper with a sole of rope impregnated with rubber. As they will not slip on wet decks, they are excellent for yachting. Such footwear finds much use also on tennis courts.

For women is available another model, the Rajah Rope Tie. It is fashioned with an all-awning stripe upper or a white upper with an awning stripe tie.

Riding the Waves on a Funflote

New Machines and Appliances



Royle Strainer Head

Strainer Head

THE quick cleaning expansion pattern straining head pictured is one of the interchangeable heads built for the No. 5 wormed geared Perfected tubing machine. The strainer head consists of two heavy castings, the heavier of which is arranged with circumferential lugs for bolt attachment to the body of the tuber; while the lighter casting is hinged as a gate to the main part of the head. The latter is centrally bored to match up with the stock screw cavity of the machine.

At its outer end the bore is expanded conically to correspond in area with the wire disk through which the rubber stock is screened. It is also recessed to accommodate the screening disk and its perforated supporting plate located in the gate-like casting.

For operation the latter is closed and secured in place with seven heavy swing bolts. This arrangement makes for easy operation and quick cleaning by slicing off of the clogged strainer wire disk from the unstrained stock back of it. A clean wire may then be set in place and screening proceed with minimum delay.

The idea of removing bits of metal, etc., from rubber and reclaim is attributed as the invention of the late Edred W. Clark, former manufacturer of tubing machines in Hartford, Conn. John Royle & Sons, Paterson, N. J.

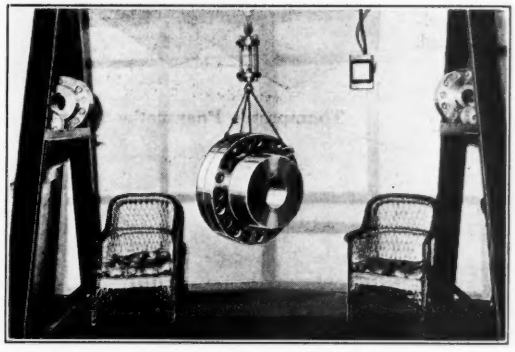
Ajax Flexible Coupling

AN EASTERN coupling manufacturer conducted a most unusual and interesting flexible coupling test at the National Convention of Iron and Steel Engineers at Cleveland in June.

The flexible element in the coupling, being the vital point subjected to shock or friction and pressure due to misalinement, was selected as the coupling part on which to make the test.

A steel frame was set up and a large 10-inch bore, 2,100 pound coupling was suspended by three rods inserted through the pin holes in the two flanges of a small 1⅜-inch bore coupling. The unit was then connected to a hoist which jolted the weight up and down, and brought direct shock and pressure to bear on the rubber bumpers.

The shock service imposed was as extreme as in any normal operation. This demonstration proves that the rubber bushing in this type of coupling will do the the work for which it is intended without loosening in the flange. Under no service conditions is the coupling subject to any great fraction of the direct pull which it received in this test as the free floating pins limit the load in service to compression and expansion, and in this test there was a deadweight pending to drag the rubbers out of the holes. The Ajax Flexible Coupling Co., Westfield, N. Y.

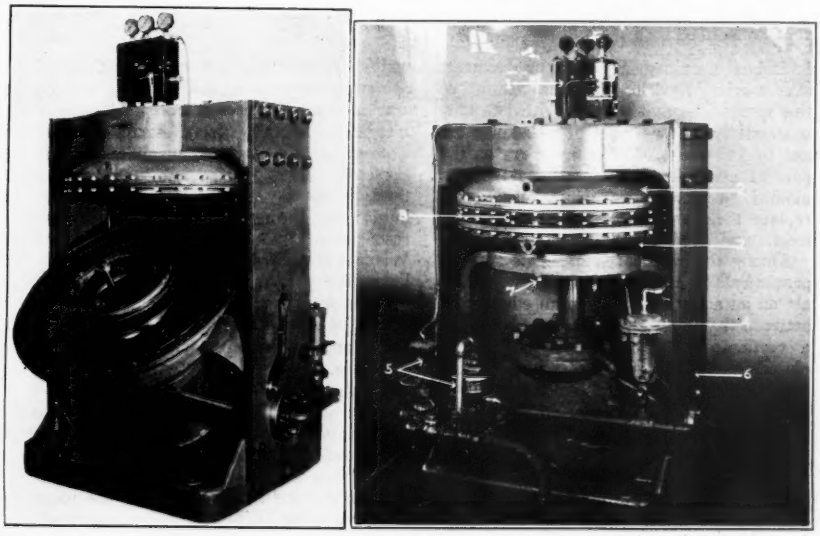


Rubber Bushing Stands Severe Test

Individual Tire Vulcanizer

THE accompanying illustrations represent a new individual tire vulcanizer for hydraulic operation. In referring to the view showing the vulcanizer in closed position, 1 is the time control device which automatically controls the closing, length of time of cure, and opening of the vulcanizer. After placing a green tire in position in the lower half of mold, the operator presses a small plunger at the side of the control, thus closing the vulcanizer; after this move the timing and the opening are automatic. This device can also be connected to operate one or more vulcanizers. As different controllers are available, none is included as standard equipment, and some tire companies prefer different types. No doubt the ideal way to operate these vulcanizers is by use of time control; however they can be operated by hand.

Again referring to the closed vulcanizer, 2 is the steam back and can be made to accommodate the particular type of mold desired. The tire mold, as shown at 3, is bolted to the open steam back, forming a steam cavity between the two, thus bringing the steam in direct contact with the back of the mold, without loss of heat. In a combination of this type mold and back an absolutely clean surfaced cavity not subject to condensate traps is assured. However other types of insert molds can be used as the backs and molds are furnished separately. A three-way diaphragm-operated air- or water-control valve, 4, regulates the air or the water in and out of the bag. One valve is required for air, and two when water is used.



Open Closed

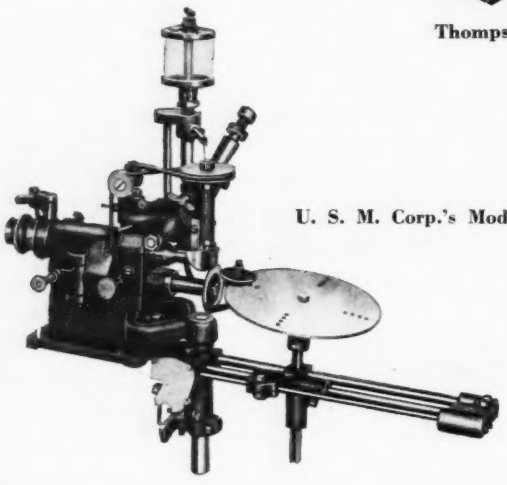
Summit Automatic Tire Vulcanizer

The hydraulic valve controlling the water for opening and closing the vulcanizer is shown at 5, and 6 shows the cam cut in the side column that operates and controls the tilting action of the lower platen into loading and unloading position. The end of a rod, of which there are three, is shown at 7. These make contact with the top of the cylinder during the last part of the downward stroke, causing the mold proper to recede from the bead ring, thereby stripping the tire from the bottom half of the mold.

One of the outstanding features of this vulcanizer is that at all times there is a follow up action, such as only hydraulic pressure can give. The Summit Mold & Machine Co., 1022-1024 S. High St., Akron, O.

Circular Trimming Machine

A NEW and improved machine for trimming the overflow on all types of molded rubber heels, soles, taps, and miscellaneous molded circular goods is illustrated.



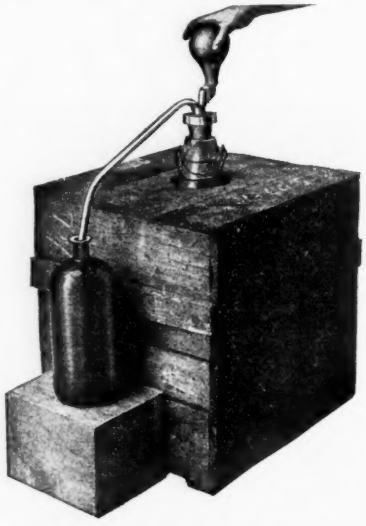
U. S. M. Corp.'s Model C Trimmer

It embodies refinements and improvements over previous models. A special feature of this model C is that it can be fitted to trim successfully various types of circular goods and thus fills a need of many years on the part of manufacturers of various types of molded circular goods for a machine to replace their present makeshift mechanical means and hand trimming methods.

Among the essential refinements and improvements in this model are cutter shafts set on an angle, resulting in an edge "bite" between the cutters and the embodiment of a vertical feed and gage which permits closer and more accurate trimming. Quick and simple adjustments are provided to adapt the machine for the different types of work. A grinder attachment is also embodied in the machine, thereby providing means for maintaining efficient results from the cutting members at all times. Although the machine is regularly fitted to use oil as a lubricant, a water tank is supplied when desired. United Shoe Machinery Corp., 140 Federal St., Boston, Mass.

Acid Pump

A DEVICE has been perfected for safe and easy removal of acids and other liquids from deep containers. The illustration shows this convenient method of operation for drawing acid out of a carboy. The stream of acid is smooth and entirely free from spurting from start to finish. To operate the pump the rubber bulb is squeezed, forcing air into the carboy through the valve. This in turn forces the liquid out through the lead pipe which reaches to the bottom of the carboy. When it is desired to stop the flow, the relief valve is pressed upward; this action permits the air to escape. The lead overflow pipe has no connection with the valve body, and, when withdrawn, no acid remains in it.



Thompson's Pneumatic Pump

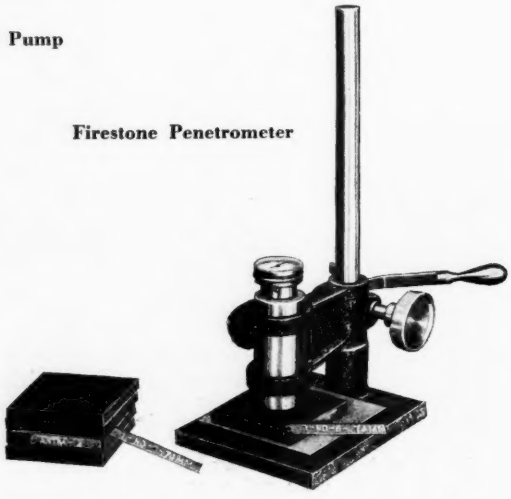
It also serves as a gage showing the amount of acid left in the carboy. Choice of lead, hard rubber, or glass tubes can be furnished, depending on the material with which they are to be used. Also an important feature is the fact that the parts are replaceable. When the valve wears out, a new one may be obtained; so there is no loss connected with the pumps. Scientific Glass Apparatus Co., Bloomfield, N. J.

Rubber Penetrometer

A RAPID and accurate penetrometer for determining the hardness of rubber has been perfected for laboratory use and is designed to render valuable practical service to the rubber industry. The penetration test of hardness is used in connection with the purchasing and grading of rubber, the development, adjustment, and perfection of processes and in checking the uniform quality of finished products independently of their size, form, and color.

The principle of the test is as follows: If a point is pressed into a piece of elastic material, the depth of penetration will depend upon: first, the pressure exerted; second, the area, shape, and material of the penetrating point; and third, the resistance offered by the material being penetrated. If the pressure is made constant and the constants of the point are carefully maintained, the depth of penetration will depend *only* upon the hardness of the penetrated material.

The specimen to be tested is placed on the bed of the instrument, here pictured, and the handle is depressed. A reading, in thousandths of an inch penetration, is obtained almost instantly from a dial gage on the instrument. The readings will vary from zero for a very soft material to 100 for a hard material. As constructed, the instrument measures the hardness of specimens ranging from ¼-inch to 8 inches thick.



Firestone Penetrometer

If the specimens being tested are plain and fairly uniform in shape and size, as many as fifteen tests per minute can be made with accuracy. It is not necessary that finished products be cut or special specimens made for this test because of the flexibility and portability of the instrument. It may be used on finished articles varying in size from rubber heels to automobile tires. The operator can make tests of articles in a "production line" without interfering with the efficiency of the other workers. The instrument can be carried from one part of a factory to another with ease. American Instrument Co., Inc., 774 Girard St., N. W., Washington, D. C.

Rubber Industry in America

OHIO

Seiberling Executive

Hard work and real ability have characterized the long business career of W. Edwin Palmer, secretary and assistant treasurer of the Seiberling Rubber Co., Akron, O. 'Way back in '99 when he joined The Goodyear Tire & Rubber Co. as a fifty-dollar-a-month clerk, his capability soon manifested itself, winning for him many promotions from bookkeeper, cashier, assistant secretary and assistant treasurer, to secretary and treasurer. In 1921, however, he cast his lot with the Seiberling company to become secretary and assistant treasurer, positions which he holds to this day.

Mr. Palmer is a local boy who has made good. He was born in Hudson, O., on August 31, 1874. Later he attended the high school and Western Reserve Academy, both in Hudson. He spent 1892 and 1893 at Eastman College, Poughkeepsie, N. Y.

W. Edwin Palmer

Even outside the business world has he merited distinction, for in 1918 he received the 33rd degree of Scottish Rite Masonry, highest honor of the order. He belongs also to all affiliated Masonic organizations.

C. O. Konrad, Akron agent for Black Rock Mfg. Co., Bridgeport, Conn., is now located at 108 S. Balch St., Akron.

The American Industrial Rubber Co., 532-36 S. St. Clair St., Toledo, manufactures industrial rubber goods from sponge to hard rubber. The company is licensed by the Rubber to Metal Corp. to vulcanize rubber to metal. Officers are: H. H. Wolfe, president; C. E. Lavender, vice president; W. B. Frey, secretary and treasurer; and Fred Knopp, purchasing agent.

Navy Balloon Wins

Six balloons entered in the 1931 national elimination race for the P. W. Litchfield trophy, sailed skyward from the Akron airport on the afternoon of July 19. Lieut. T. G. W. "Tex" Settle and Lieut. Wilfred Bushnell, flying the U. S. Navy balloon, captured the trophy, having traveled 215 miles. Second place went to Frank A. Trotter and Roland G. Blair, flying the Goodyear Zeppelin Corp. entry 190 miles. These two teams are eligible to represent the United States in the international race this year.

H. Muehlstein & Co., Inc., crude and scrap rubber dealer, moved its Akron office to larger quarters in the new Central Depositors Bank Bldg., Akron's first skyscraper.

Latex Rubber Products, Inc., a new Akron concern, on August 1 will begin operating on a continuous twenty-four-hour schedule, employing about fifty workers, in the manufacture of latex rubber specialties, including a stocking protector. Officers are: president, L. W. Crandall, who holds a similar position with the Burke Golf Co., Newark, and the Dayton-Handle & Golf Co., Dayton; vice president, John R. Gammeter, who invented the automatic machinery for dipping the rubber fabric used in the firm's products; treasurer, Alex Turner, secretary and treasurer of the Burke company; secretary, E. J. Brelsford, Burke cashier; director of sales, John A. Rishel, formerly director of footwear sales, The B. F. Goodrich Co. The new company was organized several months ago and incorporated at $200,000.

The Republic Rubber Co., Youngstown, through Vice President O. S. Dollison announced that effective August 1 Advertising Manager R. M. Gattshall has been granted one year's leave of absence to become executive manager of the Joint Merchandising Committee of the Triple Supply & Machinery Associations, which consists of the American Supply & Machinery Mfrs. Assn., the Southern Supply & Machinery Distributors Assn., and the National Supply & Machinery Distributors Assn.

Mr. Gattshall before he left announced that Norman M. Grove, of Tulsa, Okla., has joined the commercial staff of the Republic company, with headquarters in Tulsa. Mr. Grove in 1919 opened the Tulsa branch office for the Gustin Bacon Mfg. Co. and had charge of it until he joined Republic. He spent a few weeks last month at Youngstown getting acquainted with Republic policies and methods.

Goodrich Superintendent

Nearly two decades of service with the one company, years marked by many well-earned promotions, form part of the splendid record of Gilbert L. Matthias, general superintendent, Mechanical Division, The B. F. Goodrich Co., Akron, O. In 1912 he joined that organization, with which he held the following positions: draftsman; machine designer; manager, Machine Development Department; production superintendent; and general superintendent.

Gilbert L. Matthias

Mr. Matthias always has been interested in machinery. From 1906 to 1909 he served a special apprenticeship with the Morgan Engineering Co., Alliance, O. Next he was with the National Tube Co., Lorain, O., before going to Goodrich.

Galion, O., is his home town, where he was born on October 15, 1886. He was educated at Galion High School.

This executive may be reached at 388 Athens Rd., Silver Lake Village, O.

The Goodyear Tire & Rubber Co., Akron, through President Paul W. Litchfield, presented Fred Gras, mechanical goods department, with a sheepskin scroll signed by ninety-one business associates and friends in recognition of his thirty years' service with the company. Mr. Gras received other gifts from his associates in celebration of the event.

Back from a 12,000-mile tour which took it into twenty-four states, one of the two big, twelve-foot Goodyear pneumatic tires has been placed on permanent display above the factory lobby entrance of the Akron Goodyear factory, where, mounted on a pedestal, it revolves day and night, attracting almost as much attention as it did when traveling the highways of the nation.

Goodrich Notes

Meetings

Directors of The B. F. Goodrich Co., Akron, met at Akron on July 13 for the first time in two years and after a brief session in the forenoon attended the funeral of Frank H. Mason.

Officials and directors who were at the meeting included: J. D. Tew, president; T. G. Graham, first vice president; J. H. Connors, vice president; S. M. Jett, secretary; V. I. Montenyohl, treasurer; T. B. Tomkinson, comptroller; David M. Goodrich, chairman of the board; C. C. Goodrich, C. M. Keys, A. H. Marks, Charles S. McCain, Sydney Weinberg, George M. Moffett, and Frank H. Hobson.

Goodrich district advertising managers were in Akron July 13, 14, and 15 for a conference. Those present were: V. C. Carr, Boston; J. D. Kattenhorn, New York; M. P. Van Pelt, Atlanta; L. B. Cooley, Akron; A. Y. Lucal, Chicago; L. T. Griener, Kansas City; N. H. Keeling, Dallas; R. E. Jeffers, Los Angeles; and R. C. Groffmann, Kitchener, Ont., Canada.

Division managers who held their sales sessions on July 15 were: Frank Titus, Los Angeles, Pacific district; F. A. Meurin, Dallas, southwestern; G. B. Campion, New York, eastern; A. C. Kelly, western, and R. B. McTammany, central.

The conference sessions were conducted by T. G. Graham, first vice president; C. B. O'Connor, tile sales manager; P. E. Kelly, advertising manager; Guy Gundaker, Jr., sales promotion manager; H. W. Maxson, public relations manager; Wilson Brey, truck and bus tire sales; W. C. Behoteguy, merchandising manager; R. T. Griffiths, general manager, Miller division; H. E. Van Petten and E. T. Morris, advertising.

International Goodrich

International B. F. Goodrich Co., executives were entertained at luncheon on July 22, at the City Club, Akron, by the Akron Export club members and members of the Chamber of Commerce. E. E. Pardee, assistant export manager, Firestone Tire & Rubber Co., presided and Attorney Robert Guinther was toastmaster.

Personnel Activities

George Oenslager, research chemist with Goodrich twenty-six years, last month addressed professors of the University of Michigan, Ann Arbor, on the technology of rubber.

L. G. Hegner, merchandising manager of the Miller Rubber Co., Goodrich subsidiary, is the author of a book on "Retail Selling in the Drug Store," which came off the press last month. He has been with Miller ten years as a merchandiser of druggists' sundries. Prior to that time he was in the retail drug business.

R. F. Stratton, manager of the Goodrich Co., window display department, won first and second prizes in the manufacturers' display contest of the International Association of Displaymen, recently held in Boston, Mass. He submitted photographs of window displays of Goodrich products. The contest was open to manufacturers of all classes of merchandise.

More than 250,000 American motorists have joined the Silvertown Safety League it was announced on July 16.

New Product

The Diamond Rubber Co., another Goodrich subsidiary, has announced a new product, "Rubber Crimps" or "U" Type Hydraulic Packing, for service on hydraulic rams and presses, which is made in rings of standard sizes with a "U" shaped cross-section. The rubber is especially compounded to resist oil. It is covered almost completely with a layer of fabric, adding considerable strength and helping maintain the ¼-inch flare at the bottom. When worn or imperfect parts appear in the ram, the rubber packing with its flare works much more satisfactorily than any other kind.

This packing has the following important advantages: very low cost; suitable for use with pressures up to 3,000 pounds and more; not affected by the heat generated in a hydraulic press; wears very slowly and evenly; fits snugly against the ram at all times, making an absolute seal even when the ram is imperfect; thickness vertically through center is ¾-inch, twice that ordinarily used, serving to stiffen the flare and increase the strength and the life of the packing; will not dry up when a press is idle; ideally adapted for all sizes of rams; and can be furnished in any standard diameter.

Goodrich also manufactures golf ball centers, rubber grips for club shafts, rubber tees, practice mats and balls, and rubber grass for miniature golf courses.

General T. & R. Business

When The General Tire & Rubber Co., Akron, declared its 62nd consecutive dividend on its common stock, President Wm. O'Neil announced that the company had made and sold 18 per cent more tires in the first six months of the present fiscal year, which started on December 1, than during the same period in 1930.

"The tire business is getting better steadily," he said. "We sold more tires in both quarters of the first half of 1931 than in 1930, and our business in dollars and cents was considerably better during the second quarter this year than during the first.

"In the second quarter this year our company more than made up the loss that was sustained during the first three months because of a writedown in inventory due to decreasing costs of crude rubber.

"A recent survey of our principal distributers leads us to look forward to better business during the last half of 1931.

"We have been able to keep our workers on the job and we have not reduced wages, maintaining production on an even keel throughout the first half of the year. That the plants may continue to operate at the same rate, General dealers have pledged themselves to distribute almost one-fifth more tires than last year, even though it may be necessary for them to take reduced profits as so many merchants in all lines of business have been doing."

The C. P. Hall Co., chemical manufacturer, on July 1 moved its Akron office to Suite 2510, Central Depositors Bank Bldg.

The Giant Tire & Rubber Co., Findlay, has announced the appointment as eastern sales manager of R. B. (Dick) Tracy, formerly president of the Henderson Tire & Rubber Co., Columbus. He is well known to the auto tire industry in the East, the South, and the West, where for many years he represented the Michelin Tire Co. in all sales departments. Mr. Tracy was also sales manager of the Paul Rubber Co., Salisbury, N. C.

Denman Tire & Rubber Co., manufacturer of tires, Warren, with a branch at 2015 S. Michigan St., Chicago, Ill., has the following executives: E. M. Bertha, president; W. B. McCandless, vice president and treasurer; E. J. Lusk, secretary; and H. F. Webster, purchasing agent.

D. M. Grill Co., Cleveland broker, has contracted to lease for one year and then to purchase the Monoblock Rubber plant at Mooreville to manufacture rubber carpeting, battery boxes, and other patented articles.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	Inquiry
1379	Skiving machine manufacturer.
1380	Manufacturer of small outfits for making rubber hand stamps.
1381	Manufacturer of Foot Sure safety bath mat.
1382	Sponge rubber manufacturers.
1383	Seller of cork dust.
1384	Supplier of light calcined magnesia.
1385	Seller of wood flour.
1386	Manufacturer of Mermaid rubber bath spray head.
1387	Information wanted regarding factory costing of mechanical and dipped goods.
1388	Manufacturer of ink for printing advertisements on toy balloons.
1389	Supplier of Japanese Lac.
1390	Manufacturer of Shellackose, an alcohol soluble phenolic condensation resin.
1391	Manufacturer of the Nada swimming tube.
1392	Manufacturers of rubber clothing, druggists' sundries, bathing caps and shoes, and rubber specialties.
1393	Export representation for manufacturer of druggists' sundries.
1394	Manufacturer of Rubber Foam.

Foreign Trade Circulars

Special circulars containing foreign rubber trade information are now being published by the Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Number	Special Circulars
3025	British exports of footwear, April, 1931.
3026	British exports of automobile casings, April, 1931.
3027	French tire exports, April, 1931.
3028	French footwear exports, April, 1931.
3029	German tire exports, April, 1931.
3030	Belgian tire exports, March and first quarter, 1931.

NEW JERSEY

Little change occurred in the New Jersey rubber industry, except a gain in the hard rubber output. Tire plants operate at 80 per cent capacity. Production of mechanical rubber goods continues good; while the output of rubber footwear and brake lining has increased. Manufacturing rubber shoes at one Trenton plant adds another new line in that city.

Murray Rubber Co., Trenton, denies the rumor that the Master Tire & Rubber Co., Cuyahoga Falls, O., is negotiating to acquire Murray. Alfred C. Branham, Murray vice president, general manager, and receiver, declared there is no foundation for the report since no negotiations for a sale are going on at this time. Mr. Branham has been on a business trip through the South. Murray, operating at 80 per cent capacity, employs about 350 tire makers. The company finds the outlook is good.

David Stern, Inc., Paterson, has been awarded the State tire contract for the current fiscal year on a total bid of $44,786.12, nearly $1,000 more than the bid of Fineberg Co., Trenton, which was $43,833.93. But according to Purchasing Agent Edward J. Quigley, when considered on a mileage basis, the former is more advantageous to the State. Fineberg offered a 27,000-mile guarantee, and Stern 30,000 miles.

Mercer Rubber Co., Hamilton Square, announced that J. W. Reed is covering the territory in and around Texas; while H. M. West is in the West.

Horace B. Tobin, president of the Woven Steel Hose & Rubber Co., Trenton, with his wife and his daughter, is traveling through Europe. They will return in September.

Fulton Specialty Co., Elizabeth, manufacturer of rubber stamps, has abandoned plans to alter its five-story factory building on which $40,000 was to have been spent.

Pierce-Roberts Rubber Co., Trenton, reports quiet business during the past month. The company, however, operates five days a week with the usual number of employes.

Luzerne Rubber Co., Trenton, finds the hard rubber business greatly improved over last month.

Essex Receivership

Judge John Boyd Avis, of the United States District Court, has appointed Harold S. Maddock receiver for the Essex Rubber Co. and its subsidiary, Vulcan Recovery Co., both of Trenton. A petition for receivership was filed by Arthur E. Moon, of Morrisville, Pa., Essex treasurer, to allow for an amicable reorganization of the company, to conserve its assets, which its liabilities exceed, and to preserve the rights of stockholders and creditors.

Mr. Moon's action, the petition cited, was prompted by the company's lack of ready cash. It is pointed out that $100,000, representing the principal of two notes, each for $50,000, with two Trenton banks, fell due recently but the company did not have the actual funds to meet its obligations, which also included $40,000 for the maturing of a serial issue of first mortgage bonds due together with interest on $190,000 of other first mortgage bonds. Cash on hand was estimated at $24,790.77.

The company was incorporated in 1910 and operated profitably from 1925 to 1928. Then business fell off so that in the last three years the company's funds were exhausted. The volume of business increased considerably in 1931. The company has a capitalization of $1,000,000, with real estate, plant, and equipment valued at $1,000,000. It is pointed out that the company faces a loss of from $80,000 to $100,000 in 1931 by virtue of a contract for the purchase of crude rubber, and also an additional loss of $30,000 on a purchase of cotton sheeting bought for future delivery. President Clifford H. Oakley has plans for reorganizing the company's finances.

Du Pont Exhibit

Timely displays of swim toys and bathing accessories suitable for beach or pool are now being featured at the Du Pont Exhibit on the Boardwalk at Atlantic City. They are made of rubber in assorted colors and color combinations, and the displays, which are shown in the accompanying illustrations, include swim toys, bathing caps, swimming tubes, bathing sandals, playballs.

The caps are in the aviator, diving, athletic and pool, beret, and bandanna styles for juveniles and grown-ups, in new and distinctive designs, including the new pebble-crepe. Bright-colored, inflatable water toys take the form of lizards, frogs, ducks, hounds, zebras, horses, turtles, dog fish, and the popular ring float, lazy float, swim ring, and tube, jolly ball, beach ball, and playball. The displays are designed to show the application of Du Pont rubber colors and rubber accelerators.

Thermoid Company, Trenton, in reporting that sales of the concern and its wholly owned subsidiaries for the second quarter, ended June 30, 1931, showed an increase of 65 per cent over the first quarter of the year, through President Robert J. Stokes states, "Net operating profits after depreciation, available for interests and dividends, amounted to $13,768 for April and $45,333 for May. These figures compare with a loss for the first quarter. Sales of the Southern Asbestos Co., a 95 per cent owned subsidiary, for the second quarter this year were 40 per cent greater than for the first quarter. The net profits of the subsidiary for May alone amounted to $7,838, which more than eliminates the loss which Southern Asbestos showed for the first quarter." Mr. Stokes is spending his vacation with his family at Chatham, Mass., where he will remain some time.

Youngs Rubber Corp. of N. J., with factory at Enterprise Ave., Trenton, and office at 145 Hudson St., New York, N. Y., manufactures Trojan druggists' sundries. Arthur M. Youngs is president and treasurer.

Driver Harris Co., Middlesex St., Harrison, makes special electrical resistance alloys in wire, strip, sheet castings, and heater cord. Officers are: Frank L. Driver, Jr., president; F. V. Lindsey and H. D. McKeinvey, vice presidents; S. M. Tracy, secretary and treasurer; and E. A. Harleman, assistant treasurer.

The Goodyear Tire & Rubber Co., Akron, O., leased a large warehouse at 533 Adams Ave., Trenton, to conduct its wholesale business.

Seamless Rubber Co.'s Swim Toys and Bathing Caps **Essex Rubber Co.'s Swimming Tubes, Sandals, and Playballs**

Joseph Stokes Rubber Co., Trenton, has 100 per cent operation in all departments and enough orders on hand to keep busy for some time. Milton H. Martindell, vice president and secretary-treasurer, has been on an extended western trip.

The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, has appointed Roland G. E. Ullman, Philadelphia, Pa., its advertising agency.

Rubber & Asbestos Corp., 26-38 Cornelison Ave., Jersey City, is in a position to do rubber compounding and milling for the trade.

Goodall Rubber Co., Eighth and Locust Sts., Philadelphia, Pa., announced its recent purchase of the Rubberhide Co., the equipment and the offices of which, formerly at Randolph, Mass., are now in a new building at Trenton. For many years the Goodall company distributed Rubberhide products in the territories adjacent to Goodall branches in New York, Philadelphia, Chicago, Cleveland, Pittsburgh, Boston, and Trenton. Future plans include a material broadening of the Rubberhide Boot and Bootee line to embrace rubber footwear with leather, fiber, rubber, composition, and felt renewable soles. A Safety Toe feature will be optional. The officers are J. E. MacDonald, Jr., president; F. B. Williamson, Jr., vice president; George B. Wood, secretary and treasurer.

E. I. duPont de Nemours & Co., Inc., with its subsidiaries about August 1 expects to complete the organization of a new company, Krebs Pigment & Color Corp. The main office will be at Newark, and plants will be at Newark, Newport, Del., and Baltimore, Md.

Industry and Trade

From Report of National Industrial Conference Board

June passenger car and truck production is estimated at 254,760, a decline of 22 per cent under May and a 27 per cent decline under June of last year. During the first six months a total of 1,632,971 units was produced, a decrease of 29 per cent under output for the same period last year.

Retail sales in June dropped 25 per cent under sales for May and 26 per cent below sales for June, 1930, estimates being based on new car registration reports for 16 states.

Production during the first half of this year has been kept down to actual retail demand, new car stocks being only slightly larger than at the beginning of the year. Sales abroad during the first 5 months declined 39 per cent under the corresponding months of 1930. Of total production 14 per cent was sold outside the United States during the first 5 months this year, as compared with 16.3 per cent of production during the first 5 months of 1930.

Consumption of crude rubber by manufacturers in the United States for the month of June is estimated to be 37,916 long tons, showing practically no change as compared with May, which is counter to the usual seasonal decrease of 4 per cent in recent years. Consumption for June is 11 per cent over what it was in June, 1930.

Imports of crude rubber for June amounted to 45,776 long tons, an increase of 44.3 per cent over the May figure of 31,720 long tons, and of 7.3 per cent over June, 1930.

Estimates place total domestic stocks of crude rubber on hand on June 30 at 225,536 long tons, an increase of 2 per cent over May, and of 49 per cent over June 30, 1930.

EASTERN AND SOUTHERN

A. S. T. M. Officers

Announcement has been made of the following officers of the American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa., for the ensuing year: President, Frank O. Clements, technical director, Research Laboratories, General Motors Co., Detroit, Mich.; vice president, Samuel T. Wagner, consulting engineer, Reading Co., Philadelphia. Members of the Executive Committee: Arthur W. Carpenter, manager, Testing Laboratories, The B. F. Goodrich Co., Akron, O.; Kenneth B. Cook, technical manager, Manville-Jenckes Co., Pawtucket, R. I.; J. B. Johnson, chief, Material Branch, Material Division, U. S. Army Air Corps, Wright Field, Dayton, O.; George C. D. Lenth, consulting engineer, Chicago, Ill.; O. L. Moore, engineer of tests, Universal Atlas Cement Co., Chicago.

B. J. Smith

Continental Rubber Works, manufacturer of Vitalic rubber products, Erie, Pa., through Advertising Manager A. M. Humphrey has announced the appointment, effective July 1, of Benjamin J. Smith as mechanical sales manager. Mr. Smith, formerly in charge of the St. Louis, Mo., branch, has been with the company ten years.

National Electric Products Corp., with factory at Ambridge and office at 1110 Fulton Bldg., Pittsburgh, both in Pa., makes insulated wire and cables. J. J. Griffith is purchasing agent.

Montie L. Hemingway, formerly managing director, Motor & Equipment Assn., has become associated with Hemingway & Dickson, Inc., 100 E. 42nd St., New York, N. Y., convention arranger and manager.

Multibestos Co., manufacturer of brake lining, clutch facings, etc., Cambridge, Mass., in expanding its sales force to take care of steadily increasing business, has appointed as Eastern Pennsylvania representative, with headquarters at Philadelphia, E. H. McGraw, who has had ten years of practical automotive experience in that city.

The National-Erie Corp., is the new name of the National-Erie Co., Erie, Pa., maker of rubber machinery.

Rubber Manufacturers will be among 100 business men and bankers on a tour this Fall of research laboratories that is being organized by the Division of Engineering and Industrial Research of the National Research Council, 29 West 39th St., New York, N. Y., the purpose of which is to give the visitors an opportunity to see what is being done in the research field by all classes of industry small and large. On last year's tour several representatives of tire companies were in the party. This year it is planned to visit thirteen laboratories which are different from those on last year's itinerary. The forthcoming tour is scheduled for October 5-15 inclusive and is planned to start from New York.

The Conference of Smaller Industries to be held at Silver Bay, Lake George, N. Y., August 10-15, is intended to provide an opportunity for smaller plant executives to meet and study jointly a number of important industrial problems as they affect operation in the smaller units of industry. All addresses and discussions will be given from the small factory point of view.

The Grasselli Chemical Co. and the **Roessler & Hasslacher Chemical Co.,** du Pont subsidiaries, recently moved their New York, N. Y., offices to the Empire State Bldg., 350 Fifth Ave.

The Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa., according to President F. A. Merrick, has appointed G. L. Harris manager of office systems.

Fidelity Mfg. Co., Inc., Zionsville, Pa., with sales office at 154 Nassau St., New York, N. Y., manufactures Never Off tire and auto accessories including patches, plasters, auto top dressing, cement, and kits. Herman Parmet is president and purchasing agent; Arthur L. Richtmyre, vice president in charge of sales; and Belle Parmet, secretary.

The McClaren Rubber Co., Charlotte, N. C., won the State of North Carolina contract for pneumatic and solid tires and tubes for the state's various departments. McClaren bid at $144,667.40.

Huntingdon Mfg. Co., with sales offices and works at Meadowbrook, and general offices in the Bullitt Bldg., Philadelphia, both in Pa., manufactures golf balls, cover stock balata, and products for the dental trade such as refined gutta percha, semi-permanent stopping, and cavity lining.

W. J. R. Hauser, was appointed vice president of Revertex Corporation of America, 40 Rector St., New York, N. Y., at a recent meeting of the board of directors.

Harvey Willson, for three years general manager of *Tire and Auto Accessory Topics* and prior to that assistant general manager of the Rubber Manufacturers Association, has joined the executive staff of the Pennsylvania Grade Crude Oil Association, Oil City, Pa.

NEW ENGLAND

Rusco Promotions

Russell Mfg. Co., Middletown, Conn., maker of Rusco brake linings and more than 400 other fabric products, through President T. M. Russell, announced the promotion of W. T. Palmer from manager of the Replacements Department to manager of the Replacements and Equipment Departments. Ten years ago, when he originated the Replacements Department, Rusco sold no brake linings to the public. Under Mr. Palmer's guidance, however, this product shows annual sales of approximately $4,000,000 by over 40,000 dealers and authorized service stations and 225 direct factory sales representatives. In his new position in addition to the Replacements Department, he will have charge of manufacturing and sales of Rusco linings to automobile manufacturers as original equipment on their cars.

Mr. Palmer recently reported that for the period from March 25 to June 10 there was an increase of 47.5 per cent over the previous twelve-week period in the replacement sales of Rusco brake linings to motorists. New England sales were particularly active during late Spring.

H. W. Kelsey, Rusco general sales manager since 1915, has been put in complete charge of all company purchases, according to Daniel R. Weedon, recently appointed treasurer and general manager. Mr. Kelsey joined the company in 1896 in a minor capacity and within a short time became shipping clerk, a position he held for several years until sent on the road selling. After two years he became head of the new Saddlery and Webbing Department, and the next year was made manager of the Suspender Department. Three years later he was transferred to the automotive department, then in 1915 was appointed general sales manager in charge of all automotive sales.

Hazen Brown Cement Co., 462 Court St., Brockton, and branch at 100 South St., Boston, both in Mass., manufactures Haz-Bro-Tex and Hazenite rubber cements and latex adhesives. Executives are: James W. Sweany, president; Louis Brown, vice president; Lawrence E. Anderson, secretary and purchasing agent; and Max Brown, treasurer.

N. W. Mathey Co., of which N. W. Mathey is sole owner, makes liquid rubber cement. The factory is at Auburn St., Saugus, and the principal office at 130 Eastern Ave., Lynn, both in Mass.

Webster Rubber Co., Sabattus, with a branch at Auburn, both in Me., manufactures rubber soles and heels, doilies, hockey pucks, mats, stair treads, and ink wells using the following trade names: Weron, Webster, Oak Leaf, and Rainbow. Officers are: E. F. Abbott, president; D. C. Hammond, vice president and purchasing agent; M. T. Plummer, secretary and treasurer.

Hugh E. Symons

The Fisk Rubber Co., Chicopee Falls, Mass., have announced the return to its sales personnel of Hugh E. Symons and J. P. Ripley, for many years prominent in the Fisk sales organization. Mr. Symons, for two decades Fisk, Detroit, Mich., district manager, has been made

J. P. Ripley

zone manager for the Detroit zone. Mr. Ripley, formerly Fisk New York, N. Y., district manager, has been appointed to the general sales manager's staff.

Molded Rubber Sole Co., Boston, Mass., has two men out on business trips: Harry Laybolt in Pennsylvania and points south, and Max Brown in the Midwest.

The Boston & Maine Railroad recently announced a new foreign service for New England manufacturers. It has entered into an arrangement with the Bush Service Corp., which has agents in many foreign countries, for facilitating the importation of raw materials and the exportation of manufactured goods. The railroads will maintain offices for this service at Boston, Portsmouth, N. H., and Portland, Me. This new service will be under the direction of J. W. Rimmer, freight traffic manager, assisted by Frank W. Rourke, superintendent of the Mystic Terminal Co., at Boston.

Boston Shoe Show

The Twelfth Annual Boston Shoe and Leather Fair, held at the Hotel Statler, July 7, 8, 9, proved a tremendous success. A volume of sales unprecedented at any previous annual meeting resulted. More than 150 New England manufacturers occupied five complete floors of the hotel with their displays, and about 100 manufacturers from outside of New England had exhibits in other Boston hotels.

As usual rubber and rubberized material manufacturers were much in evidence. All reported considerable interest shown in their offerings, concretely demonstrated by many substantial orders. All of them voice complete confidence in the future and believe that the depression period soon will be past history. Many feel that the show, coming as it did just after the settlement of the international moratorium, proved a real boost to their business. Most of the rubber exhibitors restricted themselves to showing materials used in making shoes rather than the finished product itself. Some manufacturers reported substantial orders for rubber footwear in spite of the fact that it was not featured in the displays.

One of the fine exhibits was that of the Cambridge Rubber Co., Cambridge, Mass., which displayed rubber shoes, canvas sport shoes, etc., as well as its new "Cafco" quarter lining. This product is non-heating, has a uniform stretch, and a perfect cutting surface.

The Dewey & Almy Chemical Co., Cambridge, had a large exhibit of Darex soles and heels. In addition chemicals used in making shoes were on display.

The Pepperell Mfg. Co., Boston, displayed rubberized shoe cloth. In honor of the fair a special four-page "Pepperell Snooze Sheet" was issued containing humorous articles and notes on personalities and events of the show.

Other exhibitors were: Avon Shoe Co., Chelsea, and Avon Sole Co., Avon, both in Mass.; Essex Rubber Co., Trenton, N. J.; Firestone Footwear Co., Boston; The Goodyear Tire & Rubber Co., Akron, O.; I. Goldberg & Sons, Boston, Panco Rubber Co., Chelsea, Quabaug Rubber Co., North Brookfield, Stedfast Rubber Co., Boston, and Taunton Rubber Co., Taunton, all in Mass.

A special room was set aside for an exhibit of rare types of shoes historically associated with famous personages of a bygone era. This collection proved very popular.

The entertainment program this year was most elaborate and included harbor trips, golf tournaments, outings, and ball games. The salesmen played the buyers in a thrilling contest which the buyers won 18—5. A program was also arranged for the visiting ladies.

Meeting in conjunction with the fair were: The National Shoe Retailers' Association, The National Association of Shoe Wholesalers, and the National Shoe Travelers' Association.

Rhode Island rubber industry has been hard hit by the U. S. Rubber Co.'s policy of concentration of plants, two of which having been discontinued in Bristol and allocated to Naugatuck, Conn., the Alice Mill of the Woonsocket Rubber Co., Woonsocket, and the Keds Division of the National India Rubber Co. at Bristol. At both places the industry was one of the principal sources of employment; so closing these factories has been a serious matter to both communities. The discontinuance of the Woonsocket plant within a few months after the closing of the Millville Mill, under the same management as the Alice Mill, released several hundred operatives. About 300 workers from the Keds Division have been employed at the Naugatuck plant and have removed thereto with their families.

In the meanwhile since the discontinuance of the Keds Division local town officials and business interests have been seeking information regarding the possibility of new industries coming to Bristol. Inquiries have been received by its Chamber of Commerce from two industries, one a rubber manufacturing concern, seeking data on Bristol. It has also been reported that a new rubber company may be formed to purchase the National India Rubber Co. plant if its parent company will sell the entire property. It is said that the sponsors of the proposed new rubber company may try to buy the Warren Mfg. Co. buildings in the adjoining town of Warren and establish a rubber footwear factory there if the Bristol plant cannot be secured. That the movement to form a new rubber company is more than speculative is evidenced by the fact that several meetings of reliable business interests have been held to consider the plan, which is deemed feasible because of the large number of expert and experienced rubber operatives in Bristol and vicinity.

United States Rubber Co.'s plants at Naugatuck reopened about July 20 after having been shut down in most departments since June 26. Many employes, however, worked on extensive improvements to take care of the now-scheduled increased production. Manager Walter H. Norton recently announced that fifty more hands would be added immediately and that the plant increased production to a five-day-week.

The U. S. Rubber Co., Providence plant has been busy for several months turning out thousands of gross of golf balls. The production of beach balls and novelties has also been so brisk that day and night shifts have been necessary.

Clinton E. Little has resigned as president of the Beacon Falls Rubber Shoe Co., Beacon Falls, Conn. He joined the company twenty-five years ago as a salesman and advanced to the general sales managership. He then left to become manager of the Sole and Heel Division of the United States Rubber Co. In 1925, however, he returned to the Beacon Falls Co. as president. Mr. Little has not yet revealed his future plans.

MIDWEST

U. S. Rubber Co.

United States Rubber Co., through L. M. Simpson, general sales manager, Tire Department, Detroit, Mich., announced that tire business for the first five months of 1931 was far in excess of the business during the same period last year, both for dealer sales and sales to car manufacturers. Dealer sales throughout the country indicate a marked increase in the replacement business and show that car owners generally are paying more and more attention to the upkeep of their cars.

Operations at the Detroit plant are continuing on a seven-day week basis, while the Samson, Gillette, and Indianapolis factories, as well as the fabric plants in the South, are functioning at top speed. This activity has been necessitated by the increased demand for replacement tires as well as the addition of the new original equipment business.

The company at its Detroit plant has opened a roof garden cafeteria for its office employes. The idea originated with M. A. Clark, manager of industrial relations of the Tire Department, and the outdoor restaurant has proved extremely popular since it opened in mid-June. Noon lunches are not the only purposes to which the roof garden cafeteria is put. It is open for clubs, for evening entertainments, dances, etc.; while the United States Rubber Club, an organization of executives, meets there for its monthly sessions throughout the summer.

Sears, Roebuck & Co., Chicago, Ill., effective July 9, reduced by 5 per cent prices on its Companion tires. The reason given for this cut was that the demand for this recently introduced tire has been greater than anticipated; consequently reduction in unit costs through larger scale production is possible.

Moline Mfg. Corp., 2430 Third Ave., Moline, Ill., manufactures hard and soft mechanical rubber goods such as battery boxes, stool tips, bushings, mallets, mats, fender guards, motor supports, etc. Special products are "Shok-Pruf" screw drivers with rubber handles and "Mcmaco" one-piece rubber mallets. Company executives are: R. G. Cundy, president; H. L. McLaughlin, vice president; W. Mueller, secretary; James P. Pearson, treasurer; and W. E. Tizzard, purchasing agent.

Zack G. Oldham Co., Atwood, Ill., of which Mr. Oldham is sole owner, manufactures sponge rubber athletic equipment and specialties including "Rest Assured" chair cushions.

Van Cleef Bros., manufacturer of tape and automotive rubber and chemical products, 7800 Woodlawn Ave., Chicago, Ill., recently held a four-day annual conference of Division Sales Managers, at which it was reported that the company's business is as usual or even better, comparing very favorably with that of the last two years. The company attributes this condition not only to the merit of its products and the industry and alertness of its sales managers but also to the fact that it has maintained its national advertising program right through the present period.

"All times are good times to advertise," said Felix Van Cleef, general sales manager, "but it is an especially good time when many cut down their advertising work or drop out."

Bickett Rubber Products Corp., Anderson, Ind., manufactures mats, tubing and channel rubber, special molded goods, stair treads, rubber heels, etc. Officers are: L. M. Bickett, president and purchasing agent; F. T. Barber, vice president; C. L. White, secretary and treasurer.

Montgomery Ward & Co., Chicago, Ill., is introducing a new tire this fall, the Riverside Mate, at the same price for the 30 by 4.50 size, $4.85, as the Sears Roebuck Companion.

Collyer Insulated Wire Co., Pawtucket. An influx of new orders resulting from improved conditions and consumers buying for future needs produced a revival of business activity at the Collyer plant, which postponed an announced plan to close for the first week in July for stock-taking and vacations.

Carl D. Kennedy, well known in the planting and crude rubber industries recently received an M.S. from the University of New Hampshire for his researches in the rubber industry.

Fuse-On Rubber Co., Inc., with factory at 8 North St., and office at 122 Front St., both in Bath, Me., manufactures blowout patches. Officers include William Whitney, president and treasurer, and Alice H. Whitney, secretary.

The Converse Rubber Co., Malden, Mass., reopened on July 27, following the annual shutdown to repair machinery. Employes have been hired for a five-day week.

The Arlington Rubber Co., Dorchester, Mass., is operating on a 24-hour a day basis and reports prospects for good business in the future.

The Massachusetts Safety Council, Engineering Division, elected F. A. Washburn, of the Hood Rubber Co., Watertown, Mass., as vice president, and J. C. Neilson, of the E. I. duPont de Nemours & Co., Inc., as a member of the executive committee for two years.

The Standard Stores opened a new retail outlet at 111 Washington St., Boston, Mass., the second in that city. This company maintains a chain of tire stores throughout New England.

Harry Smith, for many years with the Firestone Rubber Co., Boston, Mass., married Mrs. Irene Wetzler Littauer, of Brookline, Mass. After the wedding the couple left for an extensive motor tour of the Canadian Provinces and the White Mountains.

William H. Lamb, territorial manager of the Firestone Tire & Rubber Co. for northeastern Massachusetts, recently married Miss Anna Kate Wells, of Asheville, N. C. The couple will take up their home at Lowell, Mass.

PACIFIC COAST

The Pacific Coast rubber trade, generally speaking, has improved its position appreciably during the past month. Midsummer slowing up has not been much in evidence in general lines, and tire sales, usually good in this season, have been notably better in units and money value than for the corresponding period last year. Prices apparently have become well stabilized, and the only changes believed to be likely are in an upward direction. The lack of anxiety about price slashing is attributed to numerous informal conferences by leading distributers and sales managers during the past few months, at which it was generally agreed to check any tendency toward price cutting and various wasteful practices in marketing tires. Some pretty definite assurances, it is said, have been received from the leaders in the trade in Akron that no unpleasant surprises are contemplated, and that it is more likely that prices will be stiffened rather than the reverse. A generous measure of support from that quarter will be welcomed by tire dealers on the Coast and doubtless everywhere else. Consistently maintained, they claim, it will put new life in the rubber business.

Crude rubber imports into Los Angeles, according to the Chamber of Commerce, show a much better average for the first half of 1931 than for the corresponding period of 1930. The total for 1930 was 34,920 tons. For January, 1931, the imports were 5,156; February, 3,902; March, 3,105; April, 5,214; May, 5,003. While much of the rubber is retained for use in the local rubber factories, a considerable portion is shipped to factories in the Midwest, which find rail rates lower from the Pacific than from the Atlantic Coast.

Official statistics for California, based on returns for over 60 per cent of the state's wage earners, show a decrease of 7.4 per cent for June, 1931, in labor in rubber manufacturing concerns as compared with June, 1930; a total payroll decrease of 8.1 per cent; and average wages, higher in recent months, of $29.34, but showing a decrease of .7 per cent from the figure of June, 1930.

General Tire & Rubber Co., Akron, O., has been experiencing a marked improvement in business on the Coast, according to reports received from distributers by Western District Manager Dan A. Kimball, whose headquarters are at 439-443 Second St., San Francisco, Calif. Company reports show that for the first six months of 1931 sales were 43 per cent higher in dollars and cents than for the similar period in 1930 and over 70 per cent in units, the latter due in some measure to the generally lower price range for all makes of tires. In several of the larger cities on the Coast sales are running much in excess of the quota set by the company. A special improvement in sales is noted in the new "dual-grip" type of tires.

Continental Rubber Co., Erie, Pa., which maintains a sales branch and warehouse at 699 Second St., San Francisco, Calif., finds an improving tendency in business in the Pacific Coast field.

Rebuilt Tires

Despite the low prices on new tires, a lively demand continues for rebuilt tires. Production of the latter has grown into a considerable business, particularly in the Southwest, which supplies a large part of the demand far up the Coast. The Los Angeles Rebuilt Tire Co., 3668 S. Main St., Los Angeles, Calif., operated by S. Schuster, averages 275 tires daily with sizes ranging from 30 by 3 high pressure to 40 by 8 truck tires. Many are sold to used car dealers and to dealers in new cars having used car departments, who thus provide attractive and serviceable casings at moderate cost. The plant uses 43 1-3 circle molds. Another concern which does well in this field is the retread plant of the Huntington Rubber Co., 1132 N. Vermont Ave., Los Angeles. The owner, H. H. Huntington, pioneer rubber man of the city, averages 175 rebuilt tires daily. In this plant also only 1-3 circles molds are used.

Los Angeles Group Rubber Division, A. C. S.

With an unusually large attendance, the Los Angeles Group, Rubber Division, A. C. S., held its fourteenth meeting on the evening of June 30 at the Engineers' Club, 833 S. Spring St., Los Angeles, Calif. F. S. Pratt, works manager of the Pacific R. & H. Chemical Co., El Monte, Calif., took office as the new president.

After dinner, Edward W. Snyder, who last year opened as manager the first plant for the making of mechanical rubber goods in a suburb of Manila, told of the success of the enterprise and of the satisfactory labor, trade, and other conditions in the islands. Vice President Charles Lamb of the West American Rubber Co., Los Angeles, Calif., discoursed interestingly on the romance and development of the rubber industry, and entertained with his experiences of a generation ago in rubber manufacturing in England, where he started as a youth to learn the art. He witnessed the making of the first set of pneumatic tires for a motor car. They were made of pure Pará rubber and went to shreds in a 5½-mile run.

Dr. Cottrell, inventor of the electrical precipitation process much used in the cement industry, told of the new method of producing carbon black through a similar means of depositing combustion products. He also indicated the possible employment as a rubber compounding ingredient of the grayish powder passed off in the burning of powdered coal and now a troublesome waste product in steam making. He furnished samples and a high-powered microscope for viewing this product.

Franz Foundry & Machine Co., Akron, O., which operates a branch factory at 726 E. 60th St., Los Angeles, Calif., where it manufactures tire molds, presses, cores, rings, etc., is quite busy, according to President C. W. Franz, who has spent the past three months at the factory. The outlook is regarded as very promising. A specialty for which the company finds a steadily increasing sale is its new full-circle, electrically operated tire mold, many of which have lately been installed for retreading work at service stations conducted by large tire companies in the Southwest.

Firestone Tire & Rubber Co. of California is operating its Los Angeles plant 6 days a week and 24 hours a day and is much ahead of its production schedule. Additions are being made steadily to its working force. President Harvey S. Firestone in a communication to a Los Angeles business executive is quoted as stating that his company can manufacture tires somewhat cheaper on the Coast than at the parent plant in Akron and that production at the Southwest factory will be steadily increased during the remainder of the year. Vice President and General Manager R. J. Cope of the Coast company has been spending the past three weeks in conference with executives at the main plant in Akron.

Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa., announces the appointment as west coast sales manager of C. A. Meier, who will make his headquarters at the Westinghouse branch, 420 S. San Pedro St., Los Angeles, Calif., for a short time, finally taking charge of the main branch at San Francisco. His territory will include eight states.

United States Rubber Co. reports that its Samson branch in Los Angeles is operating 7 days a week and 24 hours a day and is unable to keep up with orders for tires, much less to take time for some needed overhauling. It was decided July 16, however, to allow a few hours daily for a couple of weeks to make some urgent changes. New help is being steadily engaged, and the management does not expect any let up until later in the year.

American Rubber Mfg. Co., according to Col. J. L. Dodge, treasurer, is gradually increasing production at its Oakland, Calif., factory, and a steady improvement is looked for for the remainder of the year. The products include light and heavy hose and belting and a wide range of mechanicals.

Ever Ready Rubber Products Co., San Francisco, Calif., of which M. E. Dorman is president and chief owner, is operating at full capacity. Its June sales eclipsed any month in the company's history. Its products include numerous types of aprons, curtains, skirts, pure gum rubberized sheetings. J. Bisnak has replaced J. R. Adams as factory branch manager in Los Angeles.

Ideal Rubber Co., 203 W. 50th St., Los Angeles, Calif., manufactures Ideal ear stopples and soap dishes. E. L. Stair is president, and R. L. Stair purchasing agent.

Pacific Goodrich Rubber Co. is continually stepping up production at its Los Angeles plant to conform to steadily increasing demand for tires and is adding every week to its working force. General Sales Manager Frank E. Titus and Merchandising Manager R. E. Jaffers were in

Akron, O., in July conferring with executives of the parent Goodrich concern; while G. E. Brunner, manager of the specialized sales division in Akron, spent a few weeks at the Los Angeles plant.

President James D. Tew, of The B. F. Goodrich Co., Akron, O., spent the past couple of weeks visiting the chief cities on the Pacific Coast. He arrived by airplane at night in Los Angeles, July 18, on his first visit to the Coast since the Goodrich branch factory was opened in Los Angeles, May 2, 1928. He was met by Vice President Samuel B. Robertson of the California company, and a few days later was a guest of honor at a chamber of commerce luncheon.

Goodyear Tire & Rubber Co., Los Angeles, Calif., is maintaining the high output reached early in the Summer, and little change is expected before late in the Fall. General Sales Manager J. K. Hough has been spending three weeks visiting the principal distributing centers on the Coast as far as Seattle and finds the business outlook very reassuring. Vice President and General Superintendent Leroy Tomkinson has returned from a business trip to the Northwest. Lively interest is being taken in the third annual contest among dealers for the trips to Akron, one of the special features to be witnessed there this year being the launching of the new Goodyear-Zeppelin giant airship built for the Federal Government. Of the 288 who will be selected throughout the country for increasing their sales percentage, 24 will be chosen from the Coast.

Rubber Quiets Four-Cylinder Car

In a new type of four-cylinder automobile, it is claimed, vibration is so well overcome with a "floating power" feature that if the car were screened from view while running even an expert might mistake the engine unit for a six- or eight-cylinder one. The motor of the new car is so mounted on rubber that the whole power plant, it is said, can sway freely on its proper axis, and the familiar jar of "interrupted torque" of a four-cylinder engine is quite absorbed by the rubber cushion.

BRITISH CRICKETERS PRACTICE ON AN INDOOR field, where a building with a wooden floor, covered with rubber and suitably netted, provides for cricket pitches.

Injury Records in the Rubber Industry[1]

TABLE 1

RUBBER INDUSTRY, LOST-TIME INJURIES, 1930, BY INDUSTRIAL GROUPS

Industrial Group	No. of Establishments	Average Number of Employes	Man-Hours Worked (Thousands)	Number of Lost-Time Injuries: Total	Death and Permanent Total	Permanent Partial	Temporary	Number of Days Lost Time: Total	Death and Permanent Total	Permanent Partial	Temporary	Injury Rates: Frequency	Severity
All groups	**52**	**85,190**	**178,901**	**2,232**	**5**	**88**	**2,139**	**147,766**	**30,000**	**41,125**	**76,641**	**12.48**	**.83**
Mechanical rubber goods	35	34,243	75,499	809	1	45	763	41,639	6,000	21,125	14,514	10.71	.55
Rubber tires	17	50,947	103,402	1,423	4	43	1,376	106,127	24,000	20,000	62,127	13.76	1.03

PLANTS in the rubber industry reporting their accident experience have records that place the industry in the front rank of industrial safety. In 52 establishments whose employes worked 179,000,000 man-hours during 1930, the frequency rate was only 12.48 and the severity rate 0.83 as compared with rates of 18.47 and 1.97 for all industries. These rates gave the industry a standing of sixth in frequency and fifth in severity among the 28 major industrial groups. Incidentally, the 1930 reports represent an increase in exposure over 1929 when there were 42 plants with 175,000,000 man-hours.

Injuries were less frequent and less severe, and fatalities were fewer, in establishments manufacturing mechanical rubber goods than in tire plants, as shown in Table 1. The frequency and severity of permanent partial disabilities, on the other hand, is higher in the manufacture of rubber goods than in tire manufacturing plants.

Frequency rates decrease as plants increase in size, as shown in Table 2. This is also true for all industries. The experience of over 3,800 plants in all industries, however, shows that severity rates, too, decrease as plants become larger. The reverse is true in this industry, however. The bigger the plant, the higher is the rate. This may be because tire plants, with higher severity, tend to be large.

Table 3 shows that sizable declines occurred in the rates of all classes of injuries except temporary disabilities. A pronounced rise occurred in the severity rate of these injuries from 1929 to 1930.

Exceptional reductions of 52 per cent in frequency and 22 per cent in severity since 1928 are shown in Figure 1. These decreases far exceed those for industry as a whole. These changes are based on the records of plants that have reported in each of the last three years.

[1] *Industrial Accident Statistics.* Published by National Safety Council, Inc., 20 N. Wacker Drive, Chicago, Ill.

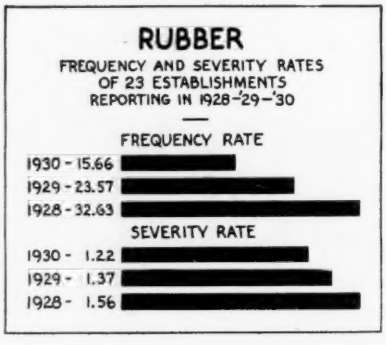


Figure 1

TABLE 2

RUBBER INDUSTRY INJURY RATES, 1930, BY SIZE OF ESTABLISHMENT

Number of Employes	Number of Establishments	Man-Hours Worked (Thousands)	Rates: Frequency	Rates: Severity
Total	53	178,901	12.48	.83
1-99	3	507	33.53	.32
100-249	8	3,275	16.18	.33
250-499	8	5,547	14.96	.48
500-749	8	10,571	15.23	.62
750-999	3	4,960	12.30	.75
1,000-up	22	154,041	12.05	.87

TABLE 3

RUBBER INDUSTRY INJURY RATES BY TYPE OF INJURY, 23 ESTABLISHMENTS REPORTING IN THREE YEARS, 1930, 1929, 1928

Year	Man-Hours Worked (Thousands)	Frequency Rate: Total	Frequency Rate: Death and Permanent Total	Frequency Rate: Permanent Partial	Frequency Rate: Temporary	Severity Rate: Total	Severity Rate: Death and Permanent Total	Severity Rate: Permanent Partial	Severity Rate: Temporary
1930	79,421	15.66	.04	.49	15.13	1.22	.23	.26	.73
1929	103,728	23.57	.10	.47	23.00	1.37	.58	.44	.35
1928	107,052	32.63	.10	.51	32.02	1.56	.62	.56	.38

OBITUARY

George C. Moore

GEORGE C. MOORE, president and founder of the George C. Moore Co., Westerly, R. I., manufacturer of elastic webbing for women's wear, died June 21 in the Peter Brent Brigham Hospital, Boston, Mass., to which he had been taken five days previously for an operation.

Mr. Moore was born in England seventy-six years ago and had lived in Westerly since 1912, when he moved his business from Worcester, Mass. Although he had served formerly as a member of the Westerly Town Council, lately he had taken no active interest in political affairs but spent a greater part of his time in travel.

Starting at the bottom of the ladder in the industry in which he became a leading factor. Mr. Moore advanced to various positions, serving as weaver, overseer, and superintendent of plants in different sections of the country. He was a general manager prior to forming his own company in Worcester in 1909. After its removal to Westerly, his firm grew so steadily that the size of the plant was increased several times until it reached proportions which made it one of the leading concerns in its field in the world.

Mr. Moore is survived by his wife, two daughters, and seven sons.

Goodrich Director

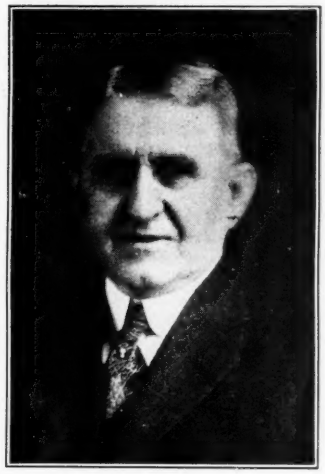
SORROW was widespread in the rubber center when news of the passing of Frank H. Mason on July 10 became known. Mr. Mason passed away suddenly and peacefully, a victim of a heart attack, on his farm at Turkeyfoot, Lake, O.

At the time of his death he was a vice president and a director of The B. F. Goodrich Co., Akron. His association with the company began in 1879, when he joined as a fifteen-cent-an-hour laborer in the mill room. He soon, however, won many promotions, becoming successively foreman, superintendent, general works manager, vice president and right-hand man of Dr. Benjamin Goodrich. With the Goodrich-Diamond Rubber Co. merger about 1912 Mr. Mason was chosen a director as well as vice chairman of the board, then for several years was active chairman.

The deceased was born at Island Point, Vt., on December 29, 1852. He was self-educated. A brief interval of his life was spent in a California mining town. At 27 he came from the Pennsylvania oil fields to seek work in Akron.

Mr. Mason was well-known for his philanthropic work. His broad charity included gifts to his adopted city, schools, churches, hospitals, and other needy organizations.

For years he was connected with the old First-Second National Bank and later with the First-City Trust & Savings Bank, of which he was vice president and a director at the time of his passing. He was also a life deacon in the first Congregational Church and belonged to the University Club.



Frank H. Mason

Surviving him are a sister, four brothers, two sons-in-law, two grandsons, and two great grandchildren. Mr. Mason's wife, their two daughters, and a granddaughter all preceded him to the Great Beyond.

Funeral services, attended by more than 200 business associates, friends, and relatives, were held on July 13 at Brighton Farm; while interment was at Glendale Cemetery.

Retired Executive

THOMAS H. THROPP, business man, sportsman, and politician, at the age of 61 died June 30 at his home, 800 W. State St., Trenton, N. J., after a long illness. Death was due to cerebral thrombus. He had been suffering also from diabetes for the past two years.

He was a son of John E. Thropp, a pioneer in the iron and foundry industry of Trenton. Thomas Thropp was educated in the local public schools and business colleges and the Spring Garden Institute, Philadelphia, Pa.

Thomas H. Thropp

Early in life he entered the business founded by his father. Upon the death of the latter the business, then becoming The John E. Thropp's Sons Co., manufacturing rubber mill machinery, was conducted by Thomas and his three brothers, John E., Peter D., and Frank W. Thomas Thropp later branched out into the flint and spar industry, and most of his business affiliations in late years were in that field. He finally secured large acreages of flint-bearing lands in New England and the South. In 1916, Mr. Thropp acquired the Trent Tile Co. and so organized it that it became one of the largest tile manufacturing firms in the country. He was the chief spirit in the Eureka Flint & Spar Co. as well as president of the former Trent Rubber Co.

Mr. Thropp entered politics when he was elected to the old Mercer County Board of Freeholders. He served also as county collector and was a member of the New Jersey Board of Commerce and Navigation since his appointment by Governor Moore in 1927 until the time of his death. He was, too, chairman of the Mercer County Republican Committee and the Republican State Committee.

Thomas Thropp had two hobbies, yachting and hunting. From boyhood he was devoted to the water, and almost all his life had a yacht, usually of the speed variety. He owned a fine home on the shores of Barnegat Bay and spent most of his leisure time there. He also donated a series of medals for high standing students in the Trenton School of Industrial Art.

He is survived by his widow, two daughters, and his brother Frank.

Former Goodrich Man

ON JUNE 28 at his home in Akron, O., Walter K. Means, former employe of The B. F. Goodrich Co., died. He joined the rubber company in 1903 and served as secretary to its various officials. Prior to his Goodrich connection Mr. Means had been with The Buckeye Mower & Reaper Co. as a private secretary and purchasing agent.

The deceased was born in Akron on July 18, 1863, and later attended the local high school. He was a member of the Fifty-Year Club, the Elks Club, and the Patriarchs Militant Club of the I. O. O. F.

Surviving him are his widow, three daughters, a sister, and a brother, Wm. A. Means, a Goodrich vice president.

Canadian District Manager

WILLIAM J. COOPER, veteran official of Gutta Percha & Rubber Ltd., which he served thirty-two years, recently passed away at Fort William, Ont., at the age of 57. He was well known to the trade throughout Western Canada. At Fort William, where he was district manager for his company, he was a highly esteemed citizen. For sixteen years prior to his Fort William managership he was on the staff of the company's Winnipeg office.

Sales Representative

WHILE dressing at the home of his niece at Bay Village, Lake Erie, E. A. ("Sam") Sattler died from a sudden heart attack on July 4. For many years he had charge of solid tire sales for the Diamond Rubber Co., Akron, O., prior to the Goodrich-Diamond merger. Then he became sales manager of the Howe Rubber Co., New Brunswick, N. J. When he retired from business three years ago because of ill health, Mr. Sattler was special representative of the Falls Rubber Co., Cuyahoga Falls, O.

He was born on July 27, 1873, at Lafayette, Ind.

Surviving him are his widow, a brother, and two sisters. Funeral services were held in Akron on July 7; while interment was in Rose Hill Cemetery.

Interesting Letters

New-Size Golf Ball

TO THE EDITOR: The present American golf ball of official size and weight is being made the subject of recurring editorials in important daily papers and in one magazine. The ball is claimed to have failed of its purpose: to give the golfer who really tries to play correctly a better opportunity to be consistent in scoring.

The Ball and Implement Committee of the U.S.G.A. is composed of high grade golfers and sportsmen who after several years of trying out different sizes and weights of balls concluded that the 1.68 by 1.55 came nearest to perfection; and although it cost the ball manufacturers an immense sum to equip their plants for the new ball, it was realized that the Committee were honorable men who were intent on increasing the pleasure of the game for all golfers, and no serious objection to the change was made.

It will be admitted that in playing the ball for the first twenty or thirty times, the player is not impressed with its behavior, but gradually, with experience, its fine qualities are discovered and the longer it is played the better it is liked, until the point is reached where to return to the 1.62 ball would meet with very serious opposition.

The attitude of the average American who takes up golf is that it is a game that any one can play who can walk four miles and swing a club. It does not occur to him that to play the game properly and thereby secure the utmost enjoyment involves taking lessons and practicing, just the same as one takes lessons in dancing, in bridge, in backgammon and other games requiring skill. Golf lessons and practice is a hard grind which the average man will not endure.

The average golfer insists on playing the game his way, which is usually the wrong way. He asks no advice usually in buying clubs or golf balls; but if he plays often he is very prone to have his opinion about clubs and balls and if he can talk loud enough or write a letter to his paper, he becomes, in his own opinion and in the opinion of his class who read his letters or hear him talk, a self-constituted authority on a subject about which he knows absolutely nothing.

Manufacturers who found their new-size ball short from the tee corrected this defect by adopting the Corona winding machine for core winding which has given even more distance than the old method of winding the 1.62 ball. There is a tendency for the new ball to rim the cup in putting, which fault making the cup one-half inch wider would correct. Perhaps the U. S. G. A. would entertain this suggestion.

R. B. CAVERLY.
HUNTINGDON MFG. CO.
Meadowbrook, Pa., July 11, 1931.

CANADA

It is reported that while the sale of sneakers is very good this year, retailers are not making much profit on them because of their low price resulting from price cutting due to competition.

The demand for natural crepe sole rubber recently improved, for shoe manufacturers realize it is now very cheap. Hilton, Wallace & Co., Ltd., London, England, which handles this material, reports that the price today is 50 per cent lower than a year ago. For children's shoes and sandals the 3/32-inch and ⅛-inch thicknesses are used; while for tennis and golf shoes the thicker sheets are more appropriate. One of the advantages claimed for crepe rubber is that there is no waste material as the residue can be readily sold to rubber manufacturers or can be used in the shoe factory for rendering into a rubber adhesive solution or cement.

The warm dry weather of the last few weeks has stimulated the demand for garden hose as lawns burnt up from the excessive heat. Dealer stocks were reduced considerably, and sales continue. Total sales this season are reported fair, with a steady demand in the immediate future.

Canadian bicycle production, according to recent figures, during 1930 reached $1,962,947, 21 per cent under the record, $2,470,383, established in 1929 and 11 per cent less than for 1928. Only three firms, all in Ontario, manufactured bicycles during the year. They had a working capital of $2,931,867, employed an average of 495 people to whom $595,641 was paid in salaries and wages, and by manufacturing processes added $578,081 to the value of purchased materials which cost $1,384,866. Among their products were 26,826 bicycles, value $706,386, and such other articles as tricycles for children, bicycle parts, and skates.

The Vancouver Automobile Dealers' Assn. is organizing a motor show for the Vancouver, B. C., Exhibition scheduled for the first week in August. The motor show will be in the new Automobile Building now being constructed at Hastings Park.

E. W. BeSaw, president of the Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., in a recent newspaper article, "Menace of Worn Tires," gives excellent advice to motorists regarding the chances they take, either from false economy or indifference, in riding on old tires.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., in newspapers from Montreal to Victoria, B. C., features the Goodyear garden hose. Another recent newspaper advertisement revealed that in a nation-wide vote on 22 makes of tires 49.29 per cent of the motorists questioned preferred Goodyear tires. Some prospect is seen of payment of a bonus in addition to the regular $5 per share, payable in October, on Canadian Goodyear common. From earnings of $8.01 per share last year the company paid $7.50 on this stock. This year because inventory losses were not so heavy as in 1930, several dollars per share have been saved, and profits for this half of fiscal year are well ahead of those for the same 1930 period, in spite of lower volume of sales.

Northern Rubber Co., Ltd., Guelph, Ont., offers the new Northern "Diamond Special" soft ball shoe as a companion to the Northern "Court Special." The new footwear is supplied in a full range of sizes for men and boys in Balmorals, and in Oxfords for women and girls.

Imperial Oil, Ltd., Toronto, Ont., soon will advertise Atlas tires in rotogravure sections of Canadian newspapers.

Canadian Goodrich Co., Ltd., Kitchener, Ont., closed its Regina, Sask., sales branch and appointed Kennedy Bros., Moose Jaw, jobber for Goodrich footwear in southern Saskatchewan, and Rogers & Masson, Lethbridge, for southern Alberta. Goodrich in large newspaper advertisements recently featured the Silvertown Safety League and its nine commandments of safety.

Kaufman Rubber Co., Ltd., Kitchener, Ont., incorporated at $1,500,000.

Dominion Rubber Co., Ltd., Montreal, P. Q., reports that its guaranteed Sportex sole and heel is exceptionally popular with sport shoe manufacturers.

Miner Rubber Co., Ltd., Granby, P. Q. General Manager T. Y. O'Neill, accompanied by W. G. Simpson, Toronto, Ont., manager, recently visited a number of the firm's accounts in eastern Ontario. President William H. Miner was guest of honor at a banquet at the Windsor Hotel, given by the Granby Board of Trade to celebrate his recent election as president of the Canadian Manufacturers' Association. Among the 100 who attended were P. E. Boivin, mayor of Granby and president of the Granby Elastic Web Co., Ltd.; Bancroft W. Henderson, of New York, N. Y., U. S. A., who came especially for the occasion; and several leading officers of the association. The day after being elected C.M.A. president, Mr. Miner became a member of the "hole in one club" at the Shaughnessy Golf Club, Vancouver, B. C. Last month Mr. Miner at his summer home, Bonnallie Lake, near Granby, was lifting a barrel of gasoline which fell and crushed his hand. He was taken to the Montreal General Hospital where part of one finger was amputated. After a three-day stay he was allowed home.

Rubber Industry in Europe

GREAT BRITAIN

Estate Outputs

Figures of estate outputs compiled by the *India Rubber Journal* indicate that with the exception of Ceylon and, to a lesser extent, India and Burma, the outputs on 383 British estates in the East increased during May, 1931, as compared with April, 1931. For the first five months of the year outputs increased about 18½ per cent over last year's figures. This rise, of course, is due to the May tapping holiday.

British Competition in U. S.

The Department of Overseas Trade has prepared a long confidential report on the possibilities of selling British rubber manufactures in competition with American goods, under the present tariff in Michigan and Ohio. The very serious difficulties confronting British manufacturers are clearly recognized, but since those two states together constitute a large market for rubber goods, strenuous efforts to enter this American field are considered well worth while.

In view of the demands made by American automobile manufacturers when placing contracts for rubber goods, it is, of course, useless for British factories to make direct shipments to Detroit; consequently local warehouses are suggested. The two items desiring most consideration for warehousing in Detroit are radiator hose and corrugated matting for car floor and running boards. In trying to compete with American firms producing these articles the British companies would have to concentrate on reducing their costs to the point where the difference between their own costs and those of their competitors would cover freight and tariff expenses, yet permit them to undersell the American firms and book a profit for themselves.

Footwear Conference

A well-attended and interesting conference was held by the Rubber Research Association on June 3 for members of the Footwear Section. G. Lever presided. Among the various topics discussed was the confusion in international statistical returns; for not only do different nations group products differently, but it is often hard to tell what products are included in a given group. Most desirable would be a key to the import and export list, showing in considerable detail the various articles in each class; this guide would have to be brought up to date at proper intervals.

Attention was called to the fact that according to statistics, the number of countries exporting rubber footwear has increased during the last ten years and that countries like Japan and Belgium, which handle the cheapest type of goods, have gained the greatest share of the export business despite a decrease in world trade of about 38 per cent by volume in 1930.

Dr. J. R. Scott reported on the work done at Croyden in regard to footwear. The Research Association has studied in detail the process of dry-heat vulcanization both with litharge and with organic accelerators.

The first steps have now been taken in investigating rubber soling. It is planned to study, not only general physical properties as strength, plasticity, etc., but also resistance to abrasion, repeated flexing, tearing and cutting by stones and stitches, tendency to spread, coefficient of friction on various paving surfaces, water absorption, permeability to air, thermal and electrical conductivity, and markings of floorings. An important part of the work will consist in developing standard testing methods and trade standards for rubber soling.

The work done so far reveals that soles now on the market show wide variations in tensile strength, from 1,200 to 2,600 pounds per square inch, and also for hardness, where the ratio was 1 to almost 3.

Dr. H. A. Daynes emphasized the importance of abrasion resistance in footwear and, consequently, of working out reliable methods of measurement to maintain quality standards. He suggested that while the specification of a standard rubber might in the end be necessary, more helpful method seemed to be the standardization of the abrasive surface.

Rubber as a Life Saver

The Davis escape apparatus, which enabled six men to escape alive from the sunken submarine *Poseidon*, was invented by R. H. Davis, managing director of Siebe, Gorman & Co. This apparatus, included in the equipment of submarine crews since a year ago, consists of a rubber-breathing bag carried on the user's chest and a buoyancy apparatus. A cylinder of oxygen is attached to the bag, and the person inhales and exhales the air which is constantly purified in the bag. The device is portable and self-contained and enables a man to stay under water for a comparatively long time. In addition it is sufficiently buoyant to carry even weak and injured men safely to the surface and to keep them afloat. Goggles are used to protect the eyes.

Company Notes

The British Goodrich Rubber Co. at Leyland was visited by Prince George on his recent tour of the industrial centers of Lancashire. He was shown the process of manufacturing paper and printing rollers and displayed much interest in a huge rubber-covered paper roll, 36 inches in diameter, 280 inches long, and weighing 15 tons, which was being ground for new paper mills at Liverpool.

The City of London Corp. has been asked by the Governors of St. Bartholomew's Hospital to consider the possibility of paving with rubber a portion of King Edward St. and Little Britain, where a great deal of heavy traffic passes.

The British Industries Fair will have a new section for cycles, motor cycles, tires, other rubber equipment, and accessories at Castle Bromwich, Birmingham, organized in cooperation with the British Cycle & Motor Cycle Manufacturers' and Traders' Union.

I. R. I. Program

A special meeting of the London Section of the Institution of the Rubber Industry was scheduled for July 20, when Prof. Lothar Hock was to read a paper on "The Importance of Intermolecular Forces in Relation to the Physical and Technical Properties of Rubber," and W. B. Wiegand one on "Some Notes on the Effect of Over-Milling on Compounded Rubber."

Other papers to be delivered during the 1931-32 session of the London and District Section are:

October 12: "Advantages and Disadvantages of Technical Training for Salesmen in the Rubber Industry." November 9. Paper by Prof. G. Bruni. December 14. "Scientific and Economic Development of the Rubber Plantation Industry," F. D. Ascoli. January 11, 1932. "Testing Antioxidants," H. J. Stern and W. Puffett. February 8. "Vibration of Buildings and Possibility of Rubber as a Useful Shock Absorber," H. C. Young. March 14. "Transportation and Storage of Goods in the Factory," C. Macbeth. April 11. "Molds and Molding of Miscellaneous Rubber Goods," H. Rogers: "Presses and Control Gear for the Rapid Molding of Miscellaneous Rubber Goods," F. Siddall.

FRANCE

International Rubber Conference

An International Rubber Conference was held in Paris, France, June 10-13, 1931, which seems to have been very successful in all respects. French and British rubber industries were well represented, and a few visitors from other parts of Europe were also present. A splendid banquet at the Hotel d'Orsay was given by the Syndicat du Caoutchouc, and visits were paid to the beautiful French Colonial Expositions which include a small rubber section.

The following papers were presented: "Degradation of Rubber by Dissolution Acid Heating," P. Bary and Fleurent; "Experiments on Autoxidation of Rubber and the Catalytic Phenomena Related Therewith," Ch. Dufraïsse and N. Drisch; "Law of Absorption of Carbonic Acid by Rubber as a Function of Time," C. Cheneveau; "Contribution to the Study of the

Preservation of Rubber," Marquis; "Crystallization of Sulphur in Rubber," Graffe; "Rubber Solutions," Stambeeger; "Concentration and Constituents of Latex," D. F. Twiss; "Examination of the Structure of Gutta-percha by X-Rays," E. A. Hauser and G. V. Susich; "Reenforcement of Rubber," Antonoff; "Further Studies on Rubber Solutions," C. W. Shacklock; "Constitution of Rubber," H. Staudinger; "Rubber Plantations in Liberia," Dr. Bouet; "Action of Fillers in Rubber Mixings," F. Boiry; "Comparison of Antioxidants in Industrial Mixings" and "Some Ideas on Reclaims and Their Vulcanization," F. Jacobs; "Rendering Rubberized Fabrics and Sheets of Rubber Impermeable to Gases; Applications to Fabrics for Balloons and Tennis Balls" and "Transmission of Heat in Rubber Mixings-Applications: Simple Control of Vulcanization of Large Masses," J. Audy; "Influence of Certain Accelerators on the Aging of Rubber," C. Martin and Thiollet; "Selection of an Antioxygen in the Rubber Industry," G. Dumonthier; "Applications of Latex in the Rubber Industry," F. Chassaing; "Rubber Plastifiers," A. Hutin; "Mixings of Rubber and Glue and Their Uses," Blondel; "Remarks of a Practical Man on the Subject of the Use of Accelerators," G. Cany; "Use of Rubber on Railways," C. Macbeth; "Use of Some Synthetic Resins in the Rubber Industry," W. J. S. Naunton and Siddle; "Problem of Mastication," F. H. Cotton; "Electrodeposition of Latex by Electrophoresis and Its Possibilities for Industrial Uses," Å. Johnston; "Note on Piperidine and the Piperidine Accelerators," P. Schidrowitz; "Twenty Years of Rubber History," E. Macfadyen; "Two years on the Rubber Plantations of British Malaya and the Netherlands Indies" (two films), P. Scholz; Lecture and Film on the Manufacture of Carbon Black, W. B. Wiegand; "Rubber in Equatorial Africa," Marchesson; "Minimum of Sulphur Necessary for Vulcanization," G. Bruni; "Certain Refinements in the Construction of Rubber Mixing Mills," G. Ardichvili.

Etablissements Hutchinson

Etablissements Hutchinson (Compagnie Nationale du Caoutchouc) reports net profits of 24,579,260 francs for the business year 1930-1931, which is about the same as for the year before. Complaint was made that the difficulties of the French rubber industry are constantly increasing, not only because of the invasion of the French domestic field by foreign firms but also in the export market. It is claimed that wages abroad have been cut, but not in France; then the industry is overtaxed, and, finally, transportation rates in France are much too high. To crown all, the manufacturer is now also required to pay a duty of 300 francs per ton of imported rubber in order to help the French plantation industry in Indo-China.

In spite of all this difficulty the firm was able to increase considerably its sales in France. But, of course, foreign trade suffered because of competition.

Reports from the branches show that the London firm was only moderately successful; while the Maunheim branch did a very satisfactory business. The participation in the Societa Industria Gomma e Hutchinson, Milan, was profitable, and the Spanish Societa Industrias del Caucho in Madrid is developing well. The firm now has an interest in Bognier et Bournet, and the two concerns between them produce practically every kind of rubber article.

Hutchinson has invested 15,000,000 francs in the Polish Pepege concern. As is known, the latter, in spite of the protection of high tariffs, is in difficulties so that the investment has not been a fortunate one. Mismanagement is charged by the French concern, which incidentally has refused further financial aid as well as the offer to control the management of the Polish company.

ITALY

The Societa Italiana Pirelli, Milan, is stated to have earned net profits of 27,830,000 lire in 1930 against 27,550,000 the year before. A dividend of 12 per cent was proposed.

GERMANY

Building Exhibition

The Building Exhibition in Berlin should have afforded German rubber manufacturers an excellent opportunity to acquaint the public with the various applications of rubber in the home. But probably because of the present business condition only three manufacturers had separate stands at the exhibition.

The Continental Gummiwerke A.-G., Hannover, displayed a berth with a rubber floor covering. In addition samples showed the wealth of colors in which the newer coverings appear. This firm also exhibited a variety of rubber articles used in the building industry, as belts, conveyers, hose.

Carl Schwanitz Gummiwerke A.-G., Berlin-Reinickendorf, devoted its large stand to the new rubber floor covering, "Gummelour," for which various advantages are claimed.

Pappe & Co., Giessen, displayed floor coverings and technical goods. But, what particularly interested the visitor was the rubber wall coverings.

In another section Kübler & Co., Berlin-Reinickendorf, demonstrated floor and wall coverings as they might be used in a bar.

Cushions filled with sponge rubber have been suggested as the most fitting upholstery for the new metal furniture.

Company Notes

Vereinigte Gothania-Werke A.-G., Gotha, is another German rubber manufacturing company that has had to omit its dividend for the past business year. On a capital of 1,000,000 marks the firm booked net profits, including the previous year's carry forward, amounting to 21,172.19. The company complains that the economy programs of the municipalities in Germany have hit them particularly in their Fire Hose Department.

Pepege Deutsche Gummiwerke A.-G., Marienburg, reports satisfactory development during the year although the balance again closed with a loss, 61,406 marks against a loss of 65,936 marks in 1929. Its name has been changed to Standard Marienburger Gummiwerke A.-G.

Rubber in the Hospital

The use of rubber in hospitals, in the form of sheeting, gloves, gowns, aprons, and shoes is rather generally known. But in *Der Technischi Handel* attention is called to the special type of rubber protective articles for X-ray work, which are less well known.

As a protection against the harmful action of X-rays, garments made with a lead rubber compound are used because lead is very resistant to these rays. The specific gravity of these compounds is naturally quite high, over 5.00, and they are flexible and easy to work up. They have an absolute protective value of about 0.4 mm. rolled lead per 1 mm. thickness. The rubber-lead sheets come in thicknesses of 1 to 6 mm. and are used chiefly to cover those parts of the body that are not to be treated by the X-rays. These sheets also serve to line protective closets.

In addition, the sheet is made into gloves, masks, caps, and aprons for doctors and attendants. Gloves used in X-ray work may be entirely of the lead-rubber or merely backed with it, and may be wrist length or have long cuffs.

The articles made of this lead-rubber naturally are very heavy. Caps weigh about 0.8 kilos; masks, 0.9 kilos; short aprons, 3.4 kilos; long aprons, 5.5 kilos; leather and lead-rubber gloves, 0.75 to 1.35 kilos according to length; and all lead-rubber gloves, 1.5 kilos (Kilo = 2.2 pounds.)

Sponge rubber is used to cover operating tables; while rubber mats are placed around the table on the floor. Mats and floor coverings of rubber in general find increasing favor in hospitals. Finally, rubber tires are used on wagons, stretchers, etc.

New Hose

By special treatment, hose in which warp and woof are of fibers are made resistant to fire, oils, dilute acids, and hot and cold water. The hose may also have a warp of fiber and woof of wire. These hose, patented by C. Vallrath & Sohn K. G., Bad Blankenburg, require no metal or rubber lining or cover.

Rubber Dispersions

An article on raw rubber dispersions in water appearing in the *Gummi-Zeitung* some time ago has provoked an interesting discussion on the respective advantages of latex and these dispersions. On the one hand it is claimed that making the dispersions is a costly procedure taking much time and requiring considerable manipulation by which the original quality of the crude rubber is changed. On the other hand it is pointed out that latex, having to be treated with ammonia, also undergoes a change; then nothing is known of its age or origin; while, finally, at the present low level of sheet and crepe, the difference in price is an item to be considered. The latex is also much more costly to ship, and if it is concentrated to save space in shipping, an additional cost of machinery, power, and labor is entailed.

Rubber Industry in Far East

MALAYA

Disinfecting Budwood

In view of the risk of spreading Hevea diseases by importing or exporting infected budwood, and the plant quarantine measures that have been taken in this connection, the Rubber Research Institute of Malaya conducted an experiment to investigate the effects of certain common fungicides on the viability of buds. The methods of treatment adopted were compatible with normal estate practice and the well-known fungicides. The investigations were undertaken on only one clone, A. V. R. O. S. 50, as follows:

Every morning, for seven consecutive week days, the budwood was waxed, treated, packed in a box, and stored in a cool dry place. Seven days after packing, each box was opened, the condition of the budsticks examined; the sticks were stripped, and 100 buddings made from each treatment. The sticks then were packed again. Sixteen days after budding, a record was made of the number of successful buddings, and after another twenty-three days a final inspection was made. With one exception the budwood was immersed in liquid, water miscible disinfectants.

The fungicide which appeared to cause the least superficial damage to the budwood was ammonium polysulphide; that causing the most serious damage was copper sulphate, and even at the weakest concentrations, some buds died. The controls developed molds more quickly than did treated material, but otherwise the fungicidal action of the various disinfectants seemed to disappear in the interval between treatment and budding. However it has been found possible to disinfect budwood packed for export without hurting the buds provided certain intensities of treatment are not exceeded. The experiments also showed that much damage can be caused by faulty waxing of the budwood or the use of wax with a high melting point. A wax, therefore, is recommended with a melting point lower than that of Entwas, but high enough to prevent softening under air temperature. A special melting tank should be installed provided with an automatic temperature control.

Sheeting Batteries

The *Rubber Research Institute of Malaya, Quarterly Journal,* publishes a report of the results of a questionnaire sent to many estates regarding factory sheeting mills with a view to ascertaining the reasons for the large variations on different estates, in order to effect improvements. Replies from over 200 estates were received, analysis of which led to the following conclusions, among others:

Mills having three smooth rolls and a marker show better standard outputs than those having only two smooth rolls and a marker.

Roll speeds as high as 68-70 feet per minute can be used successfully on first machines, and it is advantageous to have the machines geared to run at unequal speeds.

The sheeting mills on most estates are not working efficiently. The harmonization of the units can be improved, while the handling of the coagulum is far from ideal. Tanks 18 inches deep and 24 inches wide can be used to produce standard quality sheet 18 inches wide up to 1,400 pounds of dry sheets per hour.

The advantage obtained by proper working of the machines can be judged by the fact that one manager estimates the saving from increased factory output at $200 (Straits currency) per month.

Latex Paste Patent

It may be recalled that in July, 1929, Veera Kumar Singhan, of Ipoh, filed a petition for the revocation of Patent No. 419 for an invention on improvements in the manufacture of rubber, gutta percha, balata, and analogous vegetable resins, by Mervyn Stanley Sturchbury, of London, England, and E. A. Hauser, of Frankfurt a. Main, Germany.

The petition was dismissed, but, a new petition was filed, with the petitioner (Singhan) representing the interests of the public too. When after postponement, the case was again resumed, the Singhan patents were revoked because of inadequate and unscientific specification. Mr. Singhan once more appealed, prepared a new application for patent and properly worded specification, and was assured of a new grant. The case was finally settled on May 22, 1931, when Messrs. Sturchbury and Hauser, through their counsel, agreed to reduce their claim by eliminating the right to conduct the invention by means of dialysis, by means of filtration or ultrafiltration, which they first claimed. Now anyone may produce a reversible paste by filtration of the latex.

Latex Paste for Paving

The *Malayan Tin and Rubber Journal* publishes a communication regarding the Singhan process of paving with latex.

The latex is strained and bulked as usual after being brought in from the plantation and diluted to contain 20 to 25 per cent of the solids. Then sulphur, zinc oxide, alkali, etc., are added, and the latex allowed to stand until the following morning, by which time the rubber particles have vulcanized. When this latex is filtered, a reversible prevulcanized paste is obtained. The paste is easily and safely transported by pouring into any watertight container. The addition of a little alkali preservative protects the paste for any length of time from spontaneous coagulation or losing its quality of reversibility.

When this paste is to be used for road surfacing it is taken to the spot and mixed with sufficient water in a drum mixer. Then are added china clay, cement, ground limestone or lime whiting, colloidal substances like casein, albumin, glue, gum, etc., lamp or carbon black, a little zinc or magnesium oxide and barytes and the like, also, if necessary, fibers, hair, and similar reenforcing substances, emulsions of bitumen derivatives, rubber substitutes or the like. The mixture is poured and spread on the prepared road surface.

The mixture may be varied as regards the proportions of rubber and other ingredients or may be reenforced with wire netting or expanded metal as required.

It is also claimed that articles as footwear, toys, etc., can readily and cheaply be molded from the prevulcanized plastic paste.

Rubber Asphalt Surfacing

More and more it is realized that the prime need for the recovery of rubber is an important new use for it. The local press of late has been devoting much space to discussing the use of latex in road making. At the annual meeting of the Johore Planters' Association, Major B. J. Eaton, head of the Rubber Research Institute at Kuala Lumpur, gave an account of the work planned in connection with rubber roadways. $50,000 has been allocated for experimental laboratory work, and an additional grant of $150,000 has been received for practical trials on any product considered promising.

The utilization of rubber or latex in combination with asphalt or bitumen as used in modern road making will be investigated. It is considered of special value that important asphalt and bitumen interests should be associated with these investigations. Naturally, if rubber or latex is to be employed for roads, agitation against this move will not have to be feared from the powerful bitumen and asphalt interests should their product continue to be used; and their cooperation may readily be counted on should the combination of asphalt or bitumen with latex yield a superior product.

Crude Rubber Situation

The interest displayed in the experiments with rubber roads and the discussion called forth thereby has somewhat lessened the flow of correspondence regarding the crude rubber situation and the Dutch. But the latest Dutch rubber scheme has again raised the question of restriction and native rubber. The *Financial Times* learns that the scheme is not meeting with much favor in Malaya. This plan is based on the Maxwell

scheme, but allows a maximum Dutch East Indies production of 90,000 tons of dry rubber free. Plantation rubber would be restricted to 75 per cent of the 1929 output, the restriction to be enforced by export licenses. Some people believe that a cut of 40 per cent would better meet the stock situation; others say 40 per cent is insufficient without effective measures by the Dutch Government to prevent extension of native planting.

The *Malayan Tin and Rubber Journal* appears to think that until the Dutch are made to realize that the British are preparing for a rubber war, they will hold back and find some excuse to avoid restriction. This paper deplores the fact that its suggestion at the height of the Stevenson Scheme, that the Malayan Government build up a war chest to help estates financially when the inevitable rubber war with the Dutch takes place, was ignored at the time; but it still hopes that the Government may undertake to a'd estates by relieving them of the rubber duty, if not of quit rents.

A prominent Chinese visitor to Sumatra on his return to Malaya in an interview for the local press stated that conditions in Sumatra seemed not so bad as in Malaya. He had discussed restriction with one or two natives, who seemed to be suspicious and distrustful, probably fearing they would be discriminated against in some way. Nevertheless this gentleman thought that if the matter were properly presented to the natives by Malayan Asiatic rubber producers they could be made to join restriction. The native smallholders in the Dutch East Indies were of the same mentality as those in Malaya, he declared, yet the latter, to a man, favored restriction.

CEYLON

Rubber Diseases

The report on the diseases of rubber in Ceylon in 1930, by R. K. S. Murray, mycologist of the Rubber Research Scheme, Ceylon, states that no new developments took place in fungus diseases in 1930. But it is feared that the curtailment of control measures against *Fomes lignosus* and *Ustulina zonata*, the two most important fungi, will result in considerable loss from these diseases in certain districts during the next two years. This is one instance where the economies practiced to meet the present low price of rubber will eventually take their toll.

Several cases of attacks on rubber trees by white ants have been reported. Until recently it was believed that none of the Ceylon termites (white ants) could attack healthy rubber trees. But this view has had to be revised, and recent observations suggest that these pests may become as troublesome to rubber planters as they are to tea planters.

Canker is not considered very important except where tapping surfaces are affected; so it is recommended that the money usually set aside for canker scraping be spent in controlling root diseases and *Ustulina*.

NETHERLANDS EAST INDIES

Tapping Statistics

According to statistics for rubber plantations in Java and South Sumatra in 1929, relating to a tapped area of 134,826 hectares (about 82 per cent of the total), 63,617 hectares, or 47.2 per cent were tapped with one cut over one-third of the circumference. Of this, 32,846 hectares, or 24.4 per cent, on 104 estates were tapped every other day, and on 23,244 hectares, or 17.2 per cent, on 57 estates, the periodical tapping system prevailed in which the tapping period is as long as the rest period. From further statistical data it appears that no difference exists in the number of trees per tapper whether the cut over one-third or one-half is adopted; while tests have shown that the cut over one-half circumference every other day yields 20 per cent more latex than the one-third circumference system provided the time for bark renewal is the same for both systems. The more conservative method, however, is preferred because it is feared that bark consumption will be excessive and that brown bast disease will increase if the cut is lengthened to one-half the circumference.

Dr. T. A. Tengwall, in a recent publication in the *Bergcultures*, discussing this problem, states that tests have shown that when the trees are tapped over half the circumference every third day, the output equals that obtained by tapping over one-third the circumference every other day, and that in the long run the former system will yield even more latex than the latter. It is not known yet whether this advantage also applies to periodical tapping, that is if a system in which tapping is conducted over one-third the circumference for a certain length of time and the area rested for the same length of time, is changed to a system where tapping is over one-half the circumference for a given period and the area is rested for twice that period; but this seems to be probable.

Since tapping costs would be reduced by changing to a one-half circumference cut while the output was not decreased, this system is obviously more economical.

Rubber Roads

In the Netherlands East Indies, too, the advantage of rubber for roads is being widely discussed. Up to the present, however, very little experimentation has been done, but apparently this condition is to be remedied. At least, the *Bergcultures* of May 30, 1931, discusses a new way of using rubber in road making, for which patent has already been applied by Dr. Th. Hoedt and Jhr. A. J. B. van Suchtelen van de Haere, not for a rubber surface but rather a shock absorbing rubber and asphalt layer to be laid under the regular asphalt surface consisting of tiles made of an emulsion of latex and asphalt powder which was dried after coagulation. The asphalt really is made of grains of sand coated with a film of natural asphalt When the latex-asphalt emulsion is coagulated, the asphalt slowly sinks to the bottom, and a kind of sponge rubber, in which the numerous holes are filled with particles of sand and asphalt, is formed. Suitable materials are added to vulcanize the emulsion. The final product, in sheet or tile form, is fairly hard, elastic, and slightly sticky. The tiles are laid on a concrete bed on which a thin layer of hot natural asphalt has been poured. Over this another thin layer of hot natural asphalt is spread and finally a layer of asphalt and sand. In this way the rubber is hermetically enclosed. The cost of laying a road as described will not exceed five guilders per square meter.

Rubber vs. Asphalt

While experiments are being conducted to find suitable means for using rubber in roads, there are others who consider it a foolish waste of time. Dr. Ph. van Harreveld, writes in a local paper against rubber as a material useful for paving. Of course he considers only paving with blocks and states that this is not only too expensive, but unsuitable. Its elasticity is no advantage in roads, and as a paving it is exposed to the deleterious effect of oil and benzine. Then a modern road surface is not required to last for centuries since it has constantly to be broken up.

Selecting Planting Material

The points to be considered in selecting planting material were discussed at a meeting of South Sackaboemi planters by F. W. Ostendorf. While the yield of a clone merits first consideration, a number of other important factors have to be weighed, which may cause a clone to be ranked as less desirable even though it gives a maximum yield.

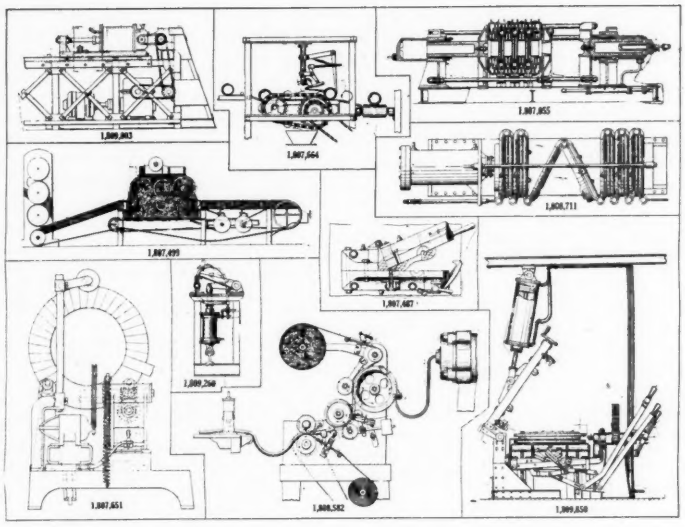
The location and the number of trees per acre greatly influence the yield of a clone so that trees that may have been highly productive in favorable surroundings, may give disappointing results in a less suitable area. Recent observation has shown that the individuals in a clone are more variable than at first supposed to be, so that in estimating the value of yield figures, it is important to consider the number of trees for which the averages are noted. This is necessary where the output seems high, for naturally a clone with a low average will not be in much demand; so there is no danger here.

The number of years during which yields for clones have been recorded is another factor; and where different clones are compared and the periods of observation are equal, it is advisable to take into account the age at which the clones were tested for a clone may be backward in the early years and then improve greatly, and vice versa.

Some clones appear to be satisfactory in most respects but are unusually sensitive to disease, or they suffer from damage by wind. In others again, the quality of the rubber varies considerably from normal trees. These differences are not apparent when the latex of various clones is mixed, but would prove undersirable if such a clone were planted alone on a large scale.

It is, therefore, apparent that great care must be taken in selecting bud wood and particularly that risks must be minimized by planting a variety of clones of different origin.

Patents, Trade Marks, Designs



Machinery

United States

1,807,055.* **Molding Press.** This press is adapted to be opened at selected points to insert and remove the work while remaining closed at other points for continuation of the molding action as in the cases of pneumatic tires and heels vulcanized in multiple cavity molds. P. E. Welton, Cuyahoga Falls, O.

1,807,487.* **Rubber Soled Shoe Mold.** Rubber soles may be molded onto leather shoes in this device. The lasted shoe with unvulcanized rubber sole is enclosed in a hinged curing mold. The shoe is then inflated by an airbag and vulcanized to the leather by heat and pressure. H. McGhee, Rushcutters Bay, Australia.

1,807,499* **Wrapping Machine.** This is designed for die stamping or cutting automobile mats continuously and rapidly from sheet material. E. H. Trump, Akron, O.

1,807,651.* **Wrapping Machine.** This relates to wrapping articles with a spiral winding of paper, etc.; the article is supported and rotated by positively driven rolls during the wrapping operation. J. Derry, Medford, assignor to A. Terkelsen, Newton, both in Mass.

1,807,664.* **Tube Waste Trimmer.** Rubber tubes are trimmed to length while on the mandrel, and the waste is removed from the tubes. These operations are performed without manual help. P. W. Lehman, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,808,582.* **Channel Making Machine.** Window-guide channels for vertically sliding sashless window panes can be made and fabric covered continuously by this machine. J. I. Taylor, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,808,711.* **Tire Vulcanizer.** This is a heater unit which may be operated independently. It consists of a group of molds composed of hinged sections adapted to fold into a pack, yet may be opened at convenient points for quick removal of the cured articles and reloading of others to be cured. H. A. Denmire, assignor to General Tire & Rubber Co., both of Akron, O.

1,809,260.* **Tube Stripper.** A device for solidifying tubes of rubber deposited from latex, by elimination of the contained water thus allows the tubes to be stripped from the mandrels without distortion or stretching. G. F. Wilson, Akron, and W. H. Slabaugh, Cuyahoga Falls, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

1,809,803.* **V-Belt Stretching Machine.** Several belts can be stretched simultaneously on this machine and in such manner that all of the belts are elongated uniformly to any degree desired. R. M. Johnson, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,809,856.* **Mold Servicing Machine.** This is a unitary device by means of which one operator at a single point can perform all of the servicing operations on a tire mold. P. W. Lehman, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,806,811. **Tread Shrinking Machine.** H. V. Lough, assignor to Hartford Rubber Works Co., both of Hartford, Conn.

1,807,023. **Golf Ball Cleaner.** A. P. Young, Pleasantville, N. Y.

1,807,591. **Applying Nuts and Washers to Valve Stems.** J. A. Fleischli, Clayton, and J. M. Kountzman, assignors to Cupples Co., both of St. Louis, all in Mo.

1,808,295. **Collapsible Tire Building Form.** P. de Mattia, Passaic, N. J., assignor to National Rubber Machinery Co., a corporation of O.

1,808,525. **Strip-Feeding Apparatus.** C. C. Cadden, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,808,544. **Boot Tree.** A. A. Glidden and T. M. Knowland, both of Watertown, and H. L. Davis, Walpole, all in Mass., assignors, by mesne assignments, to Hood Rubber Co., Inc., Wilmington, Del.

1,808,563. **Load Limiting Apparatus.** R. Mayne, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,808,710. **Tire Bead Coverer.** H. A. Denmire, assignor to General Tire & Rubber Co., both of Akron, O.

1,809,347. **Tire Tester.** J. I. Martin, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,809,433. **Tire Vulcanizer.** H. Willshaw, T. Norcross, and F. G. Broadbent, all of Erdington, England, assignors to Dunlop Tire & Rubber Corp., Buffalo, N. Y.

1,809,837. **Tubing Machine.** E. S. Ewart, assignor to Morgan & Wright, both of Detroit, Mich.

1,809,860. **Tire Tester.** T. Midgley, Hampden, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

1,809,897. **Deflating Device.** R. P. Harvey, Longmeadow, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

1,810,072. **Pneumatic Tire Builder.** H. A. Denmire, assignor to General Tire & Rubber Co., both of Akron.

1,810,406. **Cushion Tire Apparatus.** A. L. Schoff, Caldwell, and E. and G. J. Nelson, both of Belleville, all in N. J., assignors to Overman Cushion Tire Co., Inc., New York, N. Y.

1,810,585 and 1,810,586. **Tube Building Apparatus.** H. L. Young, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,810,677. **Fabric Slitter.** F. B. Pfeiffer, Akron, assignor to Seiberling Rubber Co., Barberton, both in O.

1,810,963. **Tire Retreader.** J. C. Heintz, Lakewood, O.

1,811,256. **Mold Service Device.** R. W. Brown, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,811,276. **Vulcanizer.** T. A. Miller, assignor to A. J. Fleiter, both of Akron.

1,811,284. **Tire Casing Spreader.** O. E. Sords, Cuyahoga Falls, assignor to Firestone Tire & Rubber Co., Akron, both in O.

1,811,423. **Mold Filling Apparatus.** J. W. Brundage, assignor to J. R. Gammeter, both of Akron, O.

1,811,430. **Mold Filling Apparatus.** J. R. Gammeter, Akron, O.

1,811,453. **Inner Tube Apparatus.** H. C. Bostwick, Kenmore, assignor to Akron Standard Mold Co., Akron, both in O.

1,811,567. **Vulcanizer.** F. J. Shook, assignor, by mesne assignments, to National Rubber Machinery Co., both of Akron, O.

* Pictured in group illustration.

Dominion of Canada

311,814. **Vulcanizing Apparatus Heating Control.** T. C. Hazard, Rochester, N. Y., U. S. A.

311,932. **Tire Making Device.** Goodyear Tire & Rubber Co., assignee of J. C. Tuttle, both of Akron, O.

311,945. **Pile Fabric Machine.** Lea Fabrics, Inc., formerly the Oryx Fabrics Corp., Newark, assignee of P. S. Smith, Madison, both in N. J.

312,023. **Aqueous Rubber Dispersions.** Dunlop Rubber Co., Ltd., London, N. W. 1, and Anode Rubber Co., Ltd., Guernsey, assignees of G. W. Trobridge, E. A. Murphy, D. F. Twiss, and W. G. Gorham, co-inventors, all of Birmingham, all in England.

312,672. **Press.** A. Terkelsen, Newton, assignee of J. Derry, Medford, both in Mass, U. S. A.

United Kingdom

345,330. **Cable Fireproofing Apparatus.** N. M. Loudon and Loudon Electric Wire Co. & Smiths, Ltd., London.

346,570. **Elastic Cord Machine.** Etablissements C. Faure-Roux, Loire, France.

346,709. **Tire Inflater.** R. H. Daneel, Britstown, South Africa.

347,131. **Web Winder.** Dunlop Rubber Co., Ltd., London, H. Willshaw and H. Smith, both of Fort Dunlop, Birmingham.

347,232. **Pile Fabric Machine.** Lea Fabrics, Inc., formerly Oryx Fabrics Corp., Newark, assignee of P. S. Smith, Madison, and E. G. Jegge, Montclair, all in N. J., U. S. A.

Germany

527,117. **Hydraulic Kettle Press.** New York-Hamburger Gummiwaaren Co., Hamburg 33.

527,335. **Ball Making Apparatus.** Dunlop Rubber Co., Ltd., London, England. Represented by R. and M. M. Wirth, C. Weihe, and H. Weil, all of Frankfurt a. M., and T. R. Koehnhorn, Berlin, S. W. 11.

527,888. **Vulcanizing Mold.** Herold A. G., Hamburg 33.

527,977. **Shoe Mold.** F. de Boeck, Brussels, and A. Neef, Forest-Brussels, both in Belgium. Represented by R. Linde, Berlin S. W. 48.

527,978. **Heel Repair Vulcanizer.** Firma Gust. Rafflenbeul, Schweim i. W.

527,980. **Rubber Pollers Grinder.** Eisenwerk Wülfel, Hannover-Wülfel.

France

701,620. **Tire Retreading Mold.** H. Taylor.

702,049. **Tire Repairing Device.** Societe des Procedes "Fit."

702,827. **Kneading Machines.** C. G. Schnuck and F. H. Banbury.

703,001. **Grinding Mills.** Guillumet Co., Ltd.

703,312. **Molds.** Morgan & Wright.

703,643. **Hydraulic Press Release Device Regulator.** G. Siempelkamp & Co.

704,716. **Footwear Trimmer.** H. C. L. Dunker.

704,812. **Shoe Mold.** J. Vanacker.

705,360. **Vertical Cable Press.** Fried. Krupp Grusonwerke A. G.

Process

United States

1,806,688. **Ornamental Balls.** L. R. Howes, Akron, O., assignor, by mesne assignments, to Miller Rubber Co., Inc., Wilmington, Del.

1,806,857. **Tire.** R. Liebau, Pittsburgh, Pa., assignor to Republic Rubber Co., Youngstown, O.

1,807,024. **Embossing Rubber.** R. G. Anderson, New Haven, Conn., assignor, by mesne assignments, to Wellman Co., Medford, Mass.

1,807,909. **Tire.** J. R. Gammeter, Akron, O.

1,808,091. **Tire Tube.** J. W. Waber, Chicago, Ill.

1,808,226. **Tube.** E. Hopkinson, New York, and W. A. Gibbons, Little Neck, L. I., both in N. Y., assignors to Morgan & Wright, Detroit, Mich.

1,808,428. **Curing Tires.** H. R. Minor, Ossining, N. Y., assignor, by mesne assignments, to Liquid Carbonic Corp., a corporation of Del.

1,808,429. **Regulating and Maintaining Heat Transfer.** H. R. Minor, Ossining, N. Y., assignor, by mesne assignments, to Liquid Carbonic Corp., a corporation of Del.

1,809,106. **Tire Bead.** J. C. Carlin, Gladwyne, assignor to Lee Rubber & Tire Corp., Conshohocken, both in Pa.

1,809,800. **Expansion Joint Material.** A. C. Fischer, Chicago, Ill., assignor to Philip Carey Mfg. Co., a corporation of O.

1,809,802. **Building Conduits.** L. H. Gladwin and N. G. Bruce, deceased, by E. W. Bruce, administratrix, assignors to Goodyear Tire & Rubber Co., all of Akron, O.

1,810,089. **Printing Plate.** J. Schmutz, Louisville, Ky.

1,811,656. **Repairing Punctured Tires.** A. G. Sommerbeck, Chicago, Ill., assignor to Kex Co., Inc., St. Louis, Mo.

1,811,695. **Latex Article.** T. G. Levi, assignor to Società Italiana Pirelli, both of Milan, Italy.

Dominion of Canada

311,878. **Aqueous Dispersion Product.** Anode Rubber Co., Ltd., Guernsey, assignee of P. Klein, Budapest, Hungary.

311,946. **Pile Fabric.** Lea Fabrics, Inc., formerly the Oryx Fabrics Corp., Newark, assignee of P. S. Smith, Madison, both in N. J., U. S. A.

311,964. **Rubber Covered Article.** Ohio Rubber Co., assignee of B. Bronson, both of Cleveland, O., U. S. A.

312,198. **Paving Block.** Rubber Shock Insulator Corp., assignee of A. H. Leipert, both of New York, N. Y., U. S. A.

312,410. **Footwear Cushion Tread.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of C. Roberts, Winchester, Mass., U. S. A.

United Kingdom

344,453. **Protecting Uppers during Lasting.** Etablissements R. Schneider, Paris, and A. Poelman, Seine, both in France.

344,585. **Ornamenting Wearing Apparel.** M. I. Keller, Frankfort a. M., Germany.

346,279. **Ornamenting Rubber.** O. G. Bohlin. Helsingborg, Sweden.

346,804. **Repairing Tires.** Goodyear Tire & Rubber Co., assignee of C. H. Zimmerman, both of Akron, O., U. S. A.

France

701,685. **Black Belts or Cables.** Franz Clouth Rheinische Gummiwarenfabrik A. G., and Isbeg Industrie & Schiffsbedart G. m. b. H.

702,018. **Inner Tubes and Other Joined Articles.** Dunlop Rubber Co., Ltd.

702,502. **Sponge Rubber Mattresses, Etc.** E. Faubert.

703,068. **Footwear.** H. C. L. Dunker.

Austria

121,252. **Sponge Rubber Round Objects.** R. J. Noar, Pendleton, England.

121,547. **Rubber Articles.** Soc. Italiana Pirelli, Milan, Italy.

122,000. **Mottled Sponge Rubber.** Gummi & Balata-Werke Matador A. G., Pressburg.

Chemical

United States

1,806,671. **Antioxidant.** L. J. Christmann, Jersey City, N. J., assignor to American Cyanamid Co., New York.

1,807,031. **Latex Treatment.** W. A. Gibbons, Great Neck, N. Y., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

1,807,060. **Cable Oil Compound.** W. Claypoole, Forest Hills, assignor to Texas Co., New York, both in N. Y.

1,807,244. **Adhesive Composition** R. W. Lane, Canton, assignor to Haines Corp., Boston, both in Mass.

1,807,355. **Accelerator.** W. P. TER Horst, Packanack Lake, N. J., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

1,807,616. **Chlorinated Rubber Solution.** N. Boehmer, Montclair, N. J.

1,807,930. **Rubber Reclaiming.** M. Omansky, Roxbury, assignor to Arthur D. Little, Inc., Cambridge, both in Mass.

1,808,225. **Adhesive Composition.** E. Hopkinson, New York, N. Y.

1,808,578. **Age Resister.** W. L. Semon, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,809,454. **Age Resister.** L. B. Sebrell, Silver Lake, assignor to Goodyear Tire & Rubber Co., Akron, both in O.

1,809,457. **Accelerator.** J. Teppema, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,809,798 and 1,809,799. **Age Resister.** A. M. Clifford, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,810,504. **Aqueous Dispersions.** G. G. Thornton, Erdington, Birmingham, England, assignor to American Anode, Inc., Akron, O.

1,810,560. **Composition.** B. S. Garvey, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

Dominion of Canada

311,924. **Rubber Coated Fabric.** E. I. du Pont de Nemours & Co., Wilmington, Del., assignee of J. R. Coutine, Fairfield, Conn., both in the U. S. A.

311,933. **Antioxidant.** Goodyear Tire & Rubber Co., assignee of A. M. Clifford, both of Akron, O., U. S. A.

311,934. **Making Mercaptobenzothiazole.** Goodyear Tire & Rubber Co., assignee of A. M. Clifford, both of Akron, O., U. S. A.

312,236. **Rubberizing Fabrics.** C. Dreyfus, New York, N. Y., assignee of G. Schneider, Montclair, N. J., both in the U. S. A.

312,299. **Printers' Ink.** L. C. Neale, Flemington, Australia.

312,338. **Coating Composition.** Canadian Industries, Ltd., Montreal, P. Q., assignee of C. M. A. Stine and C. Coolidge, both of Wilmington, Del., and J. E. Booge, Newark, N. J., coinventors, both in the U. S. A.

United Kingdom

345,671. **Waterproofing.** E. O. Cowper, London.

345,894. **Artificial Resins.** J. Baer, Basle, Switzerland.

345,939. **Polymerized Hydrocarbons.** Standard Telephones & Cables, Ltd., and W. E. Hugh, both of Aldwych, London.

345,944. **Wire Resistances.** I. G. Farbenindustrie A. G., Frankfort a. M., Germany.

346,079. **Amines.** Goodyear Tire & Rubber Co., assignee of A. M. Clifford, both of Akron, O., U. S. A.

346,264. **Films.** G. Möring, Hamburg, Germany.

346,351. **Cable Insulation.** W. S. Smith, Devon, H. J. Garnett, Sevenoaks, and J. N. Dean, Orpington.

346,387. **Emulsifying Agent.** I. G. Farbenindustrie A. G., Frankfort a. M., Germany.

346,446. **Rubber Dispersions.** Dunlop Rubber Co., London, and P. D. Patterson, Fort Dunlop, Birmingham.

346,491. **Imitation Leather.** Dunlop Rubber Co., London, H. C. Young and T. Donlan, both of Bradford, Manchester.

346,511. **Printing Textiles.** British Celanese, Ltd., London.

346,785. **Synthetic Rubber.** A. Carpmael, London. (I. G. Farbenindustrie A. G., Frankfort a. M., Germany.)

346,799. **Hardened Fibers and Threads.** J. Y. Johnson, London. (I. G. Farbenindustrie A. G., Frankfort a. M., Germany.)

346,853. **Accelerators.** Dunlop Rubber Co., Ltd., London, D. F. Twiss and F. A. Jones, both of Fort Dunlop, Birmingham.

347,422. **Rubberized Fabrics.** British Celanese, Ltd., London.

Germany

526,863. **Combining Rubber and Metal.** R. M. Withycombe, Sydney, Australia. Represented by W. Massohn, Berlin S. W. 61.

526,864. **Vulcanization with Chloride of Sulphur Vapor.** Deutsche Gasglühlicht-Auer-Gesellschaft m. b. H., Berlin O. 17.

527,576. **Preserving Vulcanized Rubber.** Röbel & Fiedler, Chemische Fabrik, G. m. b. H., Leipzig.

France

701,651. **Colored Goods from Rubber Dispersions.** Dunlop Rubber Co., Ltd., and Anode Rubber Co., Ltd.

701,845. **Antiagers.** I. G. Farbenindustrie A. G.

701,937. **Goods of Rubber or Similar Substances.** Dunlop Rubber Co., Ltd., and Anode Rubber Co., Ltd.

702,299. **Incorporating Pigments, Etc., in Latex.** J. Aumarechal and G. Robrieux.

702,465. **Goods of Rubber or Similar Substances.** Dunlop Rubber Co., Ltd., and Anode Rubber Co., Ltd.

702,498. **Adhesions.** R. Delamare.

702,609. **Conversion Products of Rubber.** Imperial Chemical Industries, Ltd.

703,660. **Reclaiming Rubber.** Helsingborgs Gummifabriks A. B.

703,791. **Vulcanized Products.** I. G. Farbenindustrie A. G.

704,661. **Vulcanizing Rubber.** Rubber Service Laboratories Co.

704,757. **Transformation Products of Rubber.** I. G. Farbenindustrie A. G.

704,805. **Colored Rubber.** Flintkote Co.

704,843. **Reclaiming Rubber.** O. C. Hosking.

705,158. **Vulcanization Methods.** Rubber Service Laboratories.

705,207. **Concentrating Aqueous Dispersions.** Societa Italiana Pirelli and U. Pestalozza.

705,291. **Refining Gutta Percha, Balata, Etc.** W. S. Smith, H. J. Garnett and J. N. Dean.

Austria

121,565. **Rubber Like Products from Mineral Oils.** E. W. Hultman, Los Angeles, Calif., U. S. A.

121,570. **Vulcanized Rubber.** Rubber Service Laboratories, Akron, O., U. S. A.

121,573. **New Rubber Derivatives.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.

General

United States

1,806,641. **Loaded Heel.** G. O'Gorman, Boston, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

1,806,786. **Life Saving Apparatus.** R. R. Claus, W. New York, N. J.

1,806,838. **Tire.** A. Brill, assignor to Republic Rubber Co., Youngstown, O.

1,806,861. **Composite Glass Apparatus.** W. Owen, Pittsburgh, Pa., assignor to Pittsburgh Plate Glass Co., a corporation of Pa.

1,807,044. **Fender and Guard.** F. C. Merrilies, Oak Park, Ill.

1,807,341. **Shoe Cushioning Insole.** M. C. Messler, assignor to M. Messler, both of Providence, R. I.

1,807,383. **Grinding Apparatus.** G. H. Carnahan, New York, N. Y., assignor, by mesne assignments, to Rubber Surfacers, Inc., Wilmington, Del.

1,807,401. **Shoe.** J. F. Gilkerson, Milwaukee, Wis.

1,807,669. **Hide Operating Machine.** J. W. O'Donnell, Salem, Mass., assignor to Turner Tanning Machinery Co., Portland, Me.

1,807,728. **Tire.** A. L. Broussard, assignor of nine-tenths to E. O. Broussard, both of New Orleans, La.

1,807,752. **Tire Pressure Gage.** M. J. Poster, New York, N. Y.

1,807,754. **Life Saving Device.** L. K. Richey, Detroit, Mich.

1,807,799. **Steel Retainer.** F. M. Slater, Easton, Pa., assignor to Ingersoll-Rand Co., Jersey City, N. J.

1,807,850. **Dental Plate Suction Cup.** I. Kulik, Brooklyn, N. Y.

1,808,034. **Sack.** F. H. Gregory, McAllen, Tex.

1,808,058. **Windshield.** J. Morrison, Cincinnati, assignor to Highland Body Mfg. Co., Elmwood, both in O.

1,808,063. **Sole.** M. L. Paterson, Boston, assignor to Converse Rubber Co., Malden, both in Mass.

1,808,148. **Nipple.** J. Schmid, New York, N. Y.

1,808,208. **Auto Signal Viewing Attachment.** B. W. David, Cleveland Heights, assignor to Moonbeam Mfg. Co., Cleveland, both in O.

1,808,247. **Composition Bushing.** F. C. Morris, San Francisco, Calif.

1,808,278. **Tire.** C. B. Woodworth, Port Dickinson, N. Y.

1,808,358. **Yielding Cone Disk.** A. H. Leipert, College Point, assignor to Rubber Shock Insulator Corp., New York, both in N. Y.

1,808,365. **Strut Construction.** A. F. Masury, New York, N. Y., assignor to Rubber Shock Insulator Corp., Wilmington, Del.

1,808,377. **Fountain Penholder.** A. Reichenbach, Pforzheim, Germany.

1,808,404. **Tire.** J. J. Freerksen, Steamboat Rock, assignor of one-fourth to D. Claassen, Wellsburg, both in Iowa.

1,808,418. **Buffer.** R. K. Lee, assignor to Chrysler Corp., both of Detroit, Mich.

1,808,644. **Hot Water Bottle Stopple.** G. E. Erikson, Fairfield, assignor to Bryant Electric Co., Bridgeport, both in Conn.

1,808,648. **Storage Battery Connector.** A. W. Fisher, St. Petersburg, Fla.

1,808,679. **Elastic Mattress.** H. C. Piccolini, Buenos Aires, Argentina.

1,808,681. **Cap.** G. B. Rayburn, Los Angeles, Calif.

1,808,700. **Shock Absorber.** E. J. Wendell, Wayne, Pa.

1,808,881. **Buffer.** R. Beynon, assignor to Dryden Rubber Co., Chicago, Ill.

1,809,194. **Sport Shoe.** F. W. East, assignor to I. T. S. Rubber Co., Ltd., both of Petersfield, England.

1,809,198. **Vehicle Buffer and Drawgear.** R. T. Glascodine, London, England.

1,809,330. **Toothbrush.** A. A. Dorrance and A. G. Avakian, assignors of one-third to J. G. Williams, all of Detroit, Mich.

1,809,361. **Display Form.** A. Simson, Reno, Nev.

1,809,407. **Packing.** E. N. Fox, assignor to Garlock Packing Co., both of Palmyra, N. Y.

1,809,522. **Overshoe.** P. H. Margulis, New York, N. Y.

1,809,536. **Golf Bag.** H. T. Tucker, assignor to Tucker Duck & Rubber Co., both of Fort Smith, Ark.

1,809,706. **Automobile Heel Cushion.** M. B. Jamieson, Houston, Tex.

1,809,714. **Heated Water Hose.** C. R. Mathews, Claremore, Okla.

1,809,731. **Arch Support.** W. M. Scholl, Chicago, Ill.

1,809,801. **Packing Material.** A. C. Fischer, Chicago, Ill., assignor to Philip Carey Mfg. Co., a corp. of O.

1,809,889. **Tire.** J. Davey, Belle Harbor, N. Y.

1,809,907. **Sanding Pad.** F. E. Newcomb, E. Cleveland, O.

1,810,020. **Tire Valve Stem.** H. A. King, Birmingham, Mich.

1,810,032. **Oil Hose.** E. Schulthess, S. Orange, N. J.

1,810,038. **Self Sealing Tire Tube.** J. R. Crossan, Wadsworth, O., assignor to Seiberling Rubber Co., a corporation of Del.

1,810,115. **Airbag Valve Coupling.** J. Wahl and O. Melzer, both of Queens, assignors to A. Schrader's Son, Inc., Brooklyn, all in N. Y.

1,810,293. **Door Closer.** A. Reese, Hamburg, Germany.

1,810,486. **Rubber Mask.** R. D. Lancaster, Akron, O.

1,810,556. **Water Wings.** F. Fenton, Akron, O., assignor, by mesne assignments, to Miller Rubber Co., Inc., Wilmington, Del.

1,810,619. **Wiping Roll.** C. H. Oslund, Worcester, Mass., assignor to Liquid Carbonic Corp., Chicago, Ill.

1,810,625. **Accelerator Heat Protector.** J. B. Rouse, Dunn, N. C.

1,810,655. **Bathing Cap.** R. T. Hosking, Wilmette, assignor to H. R. Hough Co., Chicago, both in Ill.

1,810,717. **Cushion Mounting.** H. C. Lord, Erie, Pa.

1,810,718. **Car.** H. C. Lord, Erie, Pa.

1,810,754. **Bobbin Changing Device.** H. Buddecke, Chemnitz, Germany.

1,810,854. **Elastic Wheel.** E. Rimailho, Paris, France.

1,810,872. **Friction Device.** H. C. Lord, Erie, Pa.

1,810,950. **Insulator.** A. C. Earhart, Cleveland Heights, O.

1,810,954. **Prune Pitter.** T. W. W. Forest, assignor to Sun-Maid Raisin Growers of California, both of Fresno, Calif.

1,810,972. **Clevis.** H. C. Lord, Erie, Pa.

1,811,414. **Tennis Ball Deflator.** J. R. Gammeter, Akron, O., assignor to A. G. Spalding & Bros., New York, N. Y.

1,811,440. **Windshield Wiper.** B. J. Shepard, Brooklyn, N. Y.

1,811,660. **Toothbrush Identifier.** H. Bausher, Montclair, N. J.

1,811,681. **Window and Screen Fastener.** W. Bildstein, Brooklyn, N. Y.

1,811,769. **Tire Inflation Indicator.** J. P. Weaver, Anderson, Ind.

1,811,781. **Overshoe.** E. R. Degge, Chicago, Ill.

1,811,803. **Sole and Heel.** L. M. Oakley, assignor to Essex Rubber Co., both of Trenton, N. J.

Dominion of Canada

311,799. **Tire.** E. W. Covey, Webb, N. Y., U. S. A.

312,087. **Ice Bag.** R. L. Shulman, Brooklyn, N. Y., U. S. A.

312,306. **Shock Absorber.** K. Schleiff, Berlin, Germany.

312,438. **Printing Roller.** Bingham Bros. Co., New York, U. S. A., assignee of F. Tutzschke, Leipzig, Germany.

312,494. **Antidazzle Device.** W. Hunter, Kincardine, Ont.

312,522. **Storage Battery.** E. W. Smith, Philadelphia, Pa., U. S. A.

312,673. **Swimming Belt.** A. Cohen, assignee of J. F. Kennedy, both of Baltimore, Md., U. S. A.

United Kingdom

344,039. **Football Boot Stud.** I. T. S. Rubber Co., Ltd., and F. W. East, both of Petersfield, Hampshire.

344,127. **Tire.** A. Herman, Cracow, Poland.

344,271. **Electric Lamp Bracket.** R. Garbs, Kankakee, Ill., U. S. A.

344,383. **Tire.** Dunlop Rubber Co., Ltd., London, and F. Fellowes, Fort Dunlop, Birmingham.

344,466. **Safety Razor.** L. Henton, Creswell, Derbyshire.

344,534. **Hair Waver.** M. Calderon, London.

344,583. **Vehicle Side Splash Guard.** A. J. Babbs, Manchester.

344,861. **Tire.** E. B. Killen, London.

345,117. **Tire Valve.** C. H. Duncan, Oshawa, Ont., Canada.

345,164. **Vehicle Spring Suspension.** Beloyt Corp., New York, assignee of H. W. Bell, Ardsley-on-Hudson, N. Y.

345,243. **Shoe Stiffeners.** British United Shoe Machinery Co., Ltd., and D. B. Macdonald, both of Leicester.

345,314. **Current Meter.** G. Ising, Stocksund, Sweden.

345,320. **Tobacco Container.** Dunlop Rubber Co., Ltd., London, and W. H. Paull, Fort Dunlop, Birmingham.

345,354. **Roller.** H. McGhee, Rushcutters Bay, Australia.

345,433. **Felt Treating Machine.** C. F. Donner Ges. Vereinigte Hutstoffewerke Block & Hirsch, Niederrad, Frankfort a. M., Germany.

345,478. **Fishing Net Float.** Continental Gummiwerke A. G., Hannover, Germany.

345,482. **Boot.** F. A. Wood, London.

345,491. **Wringer.** C. Lean, London. (G. and H. Krenzler, both of Barmen, Germany, trading as firm of G. Krenzler, Barmen, Germany.)

345,553. **Welted Footwear.** J. F. Gilkerson, Milwaukee, Wis., U. S. A.

345,554. **Gas Main Stopper.** H. Wilkinson, Slough.

345,564. **Fountain Pen.** A. Simoni, Bologna, Italy.

345,607. **Vehicle Body Support.** R. Bosch Akt.-Ges., Stuttgart, Germany.

345,746. **Tire Pump Connector.** W. Turner, Sheffield.

345,960. **Table Game.** G. Bradshaw, London.

346,012. **Tire Pressure Gage.** W. Turner, Sheffield.

346,033. **Tread.** V. C. Anderson, Seattle, Wash., U. S. A.

346,056. **Paving Slab.** J. Parsons, Blackheath.

346,144. **Torsion Spring.** H. A. Stevens, London.

346,157. **Coupling.** K. E. L. Guinness, London, and C. M. Carington, Surrey.

346,338. **Motor Support.** G. H. Fletcher, Ecclesall, Sheffield, and Associated Electrical Industries, Ltd., London.

346,391. **Tire Valve.** J. C. Crowley, Cleveland Heights, O., U. S. A.

346,476. **Pneumatic Wheel.** M. R. Conigrave. Leederville, Australia.

346,633. **Door Check.** Firestone Tyre & Rubber Co., Ltd., Middlesex. (Firestone Tire & Rubber Co., Akron, O., U. S. A.)

346,639. **Pipe.** Siemens Schuckertwerke Akt.-Ges., Berlin, Germany.

346,730. **Vehicle Body Coverings.** G. Cattaneo, Milan, Italy.

346,786. **Tire Splash Guard.** A. J. Grafham, London, and T. Priest, Buckinghamshire.

346,830 **Brake Cylinder.** L. J. LeClair, A. G. Brackenbury, and Westinghouse Brake & Saxby Signal Co., Ltd., all of London.

346,949. **Door Draught Excluder.** A. H. Pountney, Wolverhampton.

346,972. **Tire.** R. T. Smith, Great Sankey, Lancashire.

347,172. **Tire Pressure Gage.** W. Turner, Sheffield.

Germany

527,282. **Inner Tube.** W. Zaborny, Bromberg, Poland. Represented by A. Elliot, Berlin W. 30.

527,975. **Artificial Foot.** K. Magiera, Glenvitz, O.-S.

Designs

1,171,805. **Garter.** T. Leyendecker, Trier.

1,171,924. **Armband for Sphygmomanometer.** A. Schröder & Co., Berlin, N. W. 6.

1,171,998. **Connecting Rod Cushioning.** Continental Gummiwerke A. G., Hannover.

1,172,162. **Tire.** Reinhold Gollert, Berlin-Charlottenburg 4.

1,172,189. **Glove.** W. F. Thiele, Leipzig N. 22.

1,172,205. **Watch Protector.** Reinhardt Leupolt G. m. b. H., Abt. Gummiwerke, Dresden A. 1.

1,172,216. **Bathing Cap.** Continental Gummiwerke A. G., Hannover.

1,172,287. **Wine Tube.** H. Muller, Wolfstein i. d., Rheinpf.

1,172,459. **Tin Closure Disks.** Veritas Gummiwerke A. G., Berlin-Lichterfelde-Ost.

1,172,490. **Rubber-lined Spiral Hose.** K. Schroth, Frankfurt a. M.

1,172,501. **Inflatable Ball.** Gebrüder Feisenberger, Berlin N. O. 43.

1,172,600. **Heel.** Continental Gummiwerke A. G., Hannover.

1,172,628. **Hard Rubber Protective Cable Screw.** C. Weingart, Mayen b. Koblenz.

1,172,690. **Folding Boat Fabric.** A. G. Metzeler & Co., Munich.

1,172,702. **Tire.** Continental Gummiwerke A. G., Hannover.

1,172,756. **Ring for Food Screens.** A. Ludwig, Berlin W. 35.

France

701,805. **Wheels and Tires.** Dunlop Rubber Co., Ltd.

702,001, 702,002, and 702,003. **Pneumatic Tire.** Goodyear Tire & Rubber Co.

703,213. **Pneumatic Tire.** A. J. Musselman.

703,232. **Tire Repair Patch.** R. Bates.

703,313. **Sandals.** H. and F. de Poix & Cie.

703,315. **Footwear.** Dunlop Rubber Co., Ltd., and Anode Rubber Co., Ltd.

703,468. **Ventilated Coat or Vest.** O. Meyer.

703,539. **Sole.** P. Hublot.

703,656. **Wheels and Tires.** Dunlop Rubber Co., Ltd.

703,741. **Tires, Etc.** H. M. D. de Soufron.

703,855. **Ventilation for Footwear.** R. M. Jepsen.

704,908. **Footwear Fabric.** A. L. L. Josse.

705,112. **Wheels.** Dunlop Rubber Co., Ltd.

705,576. **Pneumatic Tire.** M. Fonderie.

Austria

122,007. **Inflatable Articles.** I. and L. Dorogi and Dr. Dorogi es Tarsa Gummigyar R. T., Budapest-Albertfalva, Hungary.

122,502. **Insulation.** K. D. P., Ltd., London, England.

Trade Marks

United States

283,305. Representation of a shield and thereupon the representation of a knight with two battle-axes crossed above it, and the words: **"Sir Knight."** Footwear. Huntington Shoe & Leather Co., Huntington, Ind.

283,326. **Paravar.** Chlorinated rubber varnish in solution. Naugatuck Chemical Co., New York, N. Y.

283,372. **Swavel.** Coated fabric. Pocono Rubber Cloth Co., Trenton, N. J.

283,519. **Raidtbestos.** Brake linings and clutch facings. Raybestos-Manhattan, Inc., Passaic, N. J., and Bridgeport, Conn.

283,562. **Airtex.** Pads. D. L. Irvin, New York, N. Y.

283,601. **Lucky Clover.** Chewing gum. H. S. Woolsey, doing business as Empire Gum Co., Kingston, N. Y.

283,739. **North British.** Golf balls. Niblett-Flanders Corp., N. Y., N. Y.

283,784. **Trimene.** Accelerator. Naugatuck Chemical Co., New York, N. Y.

283,790. Representation of a circle and thereupon the words: **"R. T. Vanderbilt Co., N. Y. American Products. Rodo."** Deodorants. R. T. Vanderbilt Co., Inc., New York, N. Y.

283,805. **"Bilt-Rite."** Belting. Victor Balata & Textile Belting Co., New York, N. Y.

283,807. Circle containing four triangles and the word: **"Linco"** written horizontally and vertically. Tires and tubes. Lincoln Oil Refining Co., Robinson, Ill.

283,844. **Paramount.** Golf balls. A. J. Reach, Wright & Ditson, Inc., New York, N. Y.

283,845. **'Charm."** Golf balls. H. B. Halsted, doing business as Sports Equipment Co., Detroit, Mich.

283,846. **"Keno."** Golf balls. H. B. Halsted doing business as Sports Equipment Co., Detroit, Mich.

283,871. Representation of a wrapper on two sides of which appear the words: **"Rum Gum, Clark's, Aged in the "Woods";** and on the other two sides the words: **"Rum Gum Co., Hollywood."** Chewing gum. C. P. Clark, Los Angeles, Calif.

283,885. **Kushionite.** Underlay for floor covering. St. Clair Rubber Co., Marysville and Detroit, both in Mich.

283,906. **Echo.** Golf balls. Bon-Dee Golf Ball Co., Detroit, Mich.

283,953. **Theruflex.** Belting. Thermoid Rubber Co., Trenton, N. J.

283,963. **By Gum.** Chewing gum. J. W. Bowman, doing business as By Gum Co., Philadelphia, Pa.

284,004. Circle containing three markings shaped like horseshoes. Pipes, belts, and rings. Vereinigte Stahlwerke Aktiengesellschaft, Dusseldorf, Germany.

284,024. Representation of a two-color shield with a shoe thereupon between the words: **"Dack's, 'From Maker to Wearer."** Boots and shoes. Dack's Shoes, Inc., Detroit, Mich.

284,087. Representation of trees across which appears the word: **"Warren's."** Elastic. Warren Featherbone Co., Three Oaks, Mich.

284,105. **Anoroc.** Insulated wire and cable. Simplex Wire & Cable Co., Boston, Mass.

284,158. Rectangle containing the words: **"Olympic, American Chicle Company, Long Island City, N. Y., U. S. A."** Chewing gum. American Chicle Co., Long Island City, N. Y.

284,194. Double circle containing representation of an iron cross with the word: **"Plant"** written horizontally and vertically. Flue pipes and fittings. Plant Rubber & Asbestos Works, San Francisco, Calif.

284,242. **Uze-Again.** Bottle caps. Huntington Rubber Mills, Portland, Oreg.

284,255. Representation of a section of hose. Hose. Metal Hose & Tuning Co., Inc., Brooklyn, N. Y.

284,260. **Uni-Twist.** Belting. Atwood Machine Co., Stonington, Conn.

284,276. Representation of a cross containing the word: **"Snowpak"** written horizontally and vertically, and around it the words: **"Tested, Blown, Pure, Strength."** Prophylactic articles. H. L. Ain, doing business as Goodwear Rubber Co., New York, N. Y.

284,289. **Nazalizer.** Atomizers. Nazalizer Co., Boston, Mass.

284,292. Representation of a sticker containing the word: **"Guild"** between the words: **"Hygenic"** and **"Products."** Sanitary aprons, belts, etc. L. H. Scadron, New York, N. Y.

284,321. **Westex.** Insulated wire and cable. Simplex Wire & Cable Co., Boston, Mass.

284,339. **Companion.** Tires. Sears, Roebuck & Co., Chicago, Ill.

284,406. **Moll Batist.** Bed sheeting. J. Schmid, Inc., New York, N. Y.

284,413. **Toypak.** Toys. The Toy-Pack Corp., New Haven, Conn.

Dominion of Canada

52,131. **Altax.** Accelerators. Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.

52,170. Circle containing three radiating arrow heads, and the word: **"Trias."** Footwear and accessories, combs, sponges, packing material, rubber and rubber substitutes and goods therefrom, etc. Trias Schuhindustrie-Gesellschaft m.b.H., Vienna IX, Austria.

52,248. **Usapenfold.** Golf balls. Golf Ball Developments, Ltd., Birmingham, England.

52,312. **Hi-Speed.** Tires. Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont.

52,346. **Tuxedo.** Prophylactic rubber goods. S. S. Kohn, Newark, N. J., U. S. A.

United Kingdom

511,340. Triangle containing a circle within which is representation of a ship, and at base of triangle the words, in Russian characters: **"U. S. S. R. Moscow";** also a circle containing, in Russian characters, the words: **"State Trust of Rubber Industry, The Supreme Economic Council Rubber Trust U. S. S. R."** Goods not included in classes other than Class 40, Gosudarstvenni Trust Resinovoi Promishlennosti "Resinotrust," Moscow, Russia.

515,819. **Parazin.** Printing plates. Parazin Printing Plate, Inc., Rochester, N. Y., U. S. A.

520,046. **Vulcanoz.** Accelerators, etc. British Dyestuffs Corp., Ltd., Manchester.

520,373. **Daylite.** Shoe accessories. The Harboro' Rubber Co., Market Harborough, Leicestershire.

521,473. **Saddelite.** Goods composed of rubber and cotton not including saddles or goods of a like kind. Dunlop Rubber Co., Ltd., Erdington, Birmingham.

522,254. **Durateste.** Surgical goods. Le Brasseur Surgical Mfg. Co., Ltd., Birmingham.

522,530. Representation of a winged horse and on it the word: **"Pegasus."** Belting. Stephens Belting Co., Ltd., Birmingham.

522,957. Diamond containing representation of a man and a dog and the word: **"Wayfarer."** Tires and tubes. Pirelli, Ltd., London, N. W. 1.

Labels

United States

39,202. **A. W. Faber Eraser Kit.** Eraser container. A. W. Faber, Inc., Newark, N. J.

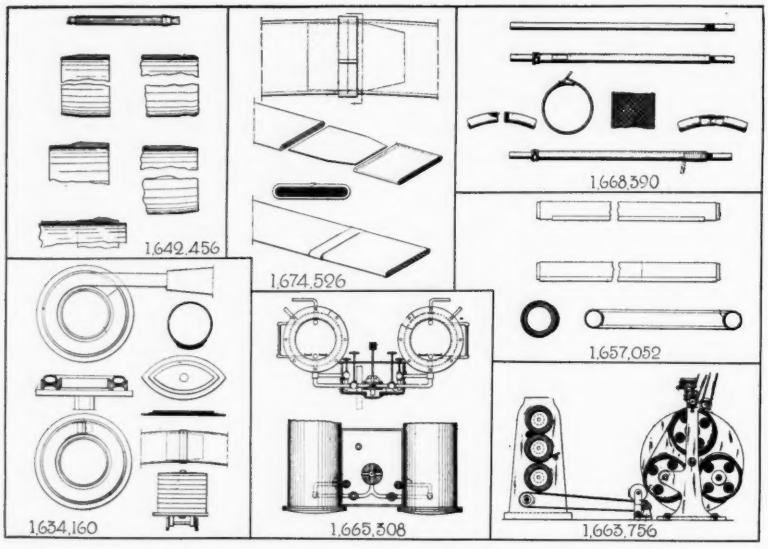
39,282. **Shelby's Menthol Chewing Gum.** Chewing gum. Shelby Gum Co., Richland, O.

39,324. **Beech-Nut Brand Chewing Gum.** Wintergreen. Chewing gum. Beech-Nut Packing Co., Canajoharie, N. Y.

39,328 and 39,329. **Lucky Penny Chewing Gum.** Chewing gum. Orbit Listerated Gum Co., Chicago, Ill.

39,336 and 39,337. **Wrigley's Pepsin Chewing Gum.** Chewing gum. Wm. Wrigley, Jr., Co., Chicago, Ill.

Making Inner Tubes



THE following abstracts of United States patents relating to the manufacture of inner tubes are continued from INDIA RUBBER WORLD, July 1, 1931:

125. James, 1,626,412. Apr. 26, 1927. Rubber tubes are made by feeding a strip of sheeted rubber stock to a tube-rolling position, severing it into blanks, the leading end portion of the strip being fed in intermittent movements timed with the severing operation and the severed blanks being fed in intermittent movements of such relative length and so timed as to step each blank ahead of the next and support it in spaced relation thereto at the rolling position, and there rolling the blanks upon mandrels in the form of tubes.

126. Tew, 1,628,286. May 10, 1927. Making rubber tubes comprises forming successive elongated blanks of warm and tacky rubber stock, longitudinally feeding the blanks to a rolling position without intermediate storage, and there mounting each blank upon a mandrel by rolling the mandrel transversely upon the blank, the blanks being formed in spaced-apart relation in procession by severing and removing zones of stock from a continuous strip of stock.

127. Callahan, 1,628,821. May 17, 1927. Inserting a fluid-passage member into the wall of a tube comprises the forming of a short tubular structure, building thereinto a fluid-passage member during such formation, forming a relatively long tubular structure, and connecting the ends of the latter structure to form a tubular annulus by inserting between and joining to the ends the short tubular structure.

128. Semple, 1,634,160. June 28, 1927. Collapsible endless tubes are made by shaping hot rubber stock into a continuous tube of closed cross-sectional form, bending the tube in such cross-sectional form to approximately its final condition of longitudinal curvature before substantial cooling of the tube. The tube is bent by uniform progression of external bending forces along the tube without full-section internal support of the tube in the region of such forces, cutting successive lengths from the curved portion of the continuous tube, joining together the two ends of respective lengths, and vulcanizing the resulting endless tubes under internal fluid pressure. (See group illustration.)

129. Fairchild, 1,638,659. Aug. 9, 1927. The method comprises providing a tube of unvulcanized rubber, providing a ring composed of two superimposed strips of unvulcanized rubber with interposed fabric reenforcing means, inserting a valve stem through the ring, positioning the ring into one of the free ends of the tube so that the valve stem extends therethrough, abutting the opposite end of the tube with the first mentioned end so that both ends of the tube embrace the ring, kneading the material of the tubes adjacent the ends so that the free ends of the tube and the ring become substantially homogeneous, and then vulcanizing tube and ring.

130. Maynard, 1,642,456. Sept. 13, 1927. A tube end beveling and sealing device constructed of a ring of resilient material has a thickness intermediate its ends greater than the thickness adjacent either end. (See group illustration.)

131. Smith, 1,642,566. Sept. 13, 1927. This invention includes an apparatus for unwrapping and stripping inner tubes from mandrels having a framework, means located centrally of the framework to hold a supply of wrapped tubes, a support for holding the mandrels, while they are being unwrapped, located at one side of the apparatus, means for removing the wrapping from the mandrel, a stripping device on the other side of the apparatus, and an inclined rail leading from the unwrapping side of the apparatus to the stripping side.

132. Semple, 1,643,999. Oct. 4, 1927. The method comprises continuously forming a tubular strip of plastic rubber stock and feeding it from the forming position, continuously bending the strip by progression as it passes the forming position to give it approximately the longitudinal curvature desired in the finished annular tube, feeding the strip continuously through a helical path from the position where it is so bent, and at the delivery end of the path, cutting successive lengths from the strip substantially without stopping the forward feeding of the residue; the bending of the strip is effected by external engagement therewith, without full-section internal support of the tube at the bending position.

133. Donovan, 1,646,953. Oct. 25, 1927. The method comprises molding on the tube during vulcanization a pair of lines at right angles to each other, one extending circumferentially of the tube and parallel to its axis, and the other extending transversely of the tube, and locating the valve parts by such markings after the tube is vulcanized.

134. Maynard, 1,649,358. Nov. 15, 1927. A skived end is made on a rubber tube by mounting the tube upon a mandrel, trimming the tube end to a predetermined length, applying a strip of rubber, of less gage than the tube body, to the tube end so that it lies partly upon the tube and partly upon the mandrel, compressing the end of the tube against the mandrel, and vulcanizing the tube.

135. Webster, 1,657,052. Jan. 24, 1928. The method consists in forming a rubber tube on a mandrel, applying to the tube a longitudinal rubber strip of less length than the tube, stretching the longitudinal strip co-equal in length with the tube in its normal position, vulcanizing the longitudinal strip to the tube in its normal position, removing the tube from the mandrel, and then looping the tube and permanently joining its ends to form a continuous, annular inner tube, whereby the longitudinal strip will be positioned on the inner periphery of the annular inner tube. (See group illustration.)

136. Lowe, 1,660,343. Feb. 28, 1928. A combined clamping, cutting, and skiving device for tire tube manufacture consists of metal strip having the cross-section of a wide spreading V, formed with its ends overlapping and the apex of the V turned inwardly, to define a cutting edge, and means for constricting the device upon a mandrel to sever a tube thereon and skive the tube end.

137. Gammeter, 1,663,754. Mar. 27, 1928. Annular rubber tubes are made by winding a plurality of layers of tacky rub-

ber stock onto a form with one layer offset from another, to provide stepped margins, then folding the stepped margins onto the intermediate portion and joining them together with the two edge faces of each ply substantially abutting each other, and vulcanizing the resulting tube in a mold under internal fluid pressure.

138. Goodwin, 1,663,756. Mar. 27, 1928. An apparatus comprises a substantially cylindrical form of a diameter such as to receive as a winding thereon a strip of tube-forming stock to be formed as an inner tube by the joining of its margins in a longitudinal seam, a support for the strip of stock having an upwardly facing surface of such extent as to support in spread condition thereon substantially the entire strip, and means for effecting such relative movement of the support and the form as to cause the strip to be wound upon the form by relative running of the form upon the support. (See group illustration.)

139. Laursen, 1,665,308. Apr. 10, 1928. The method of vulcanizing tubes consists in placing them upon poles, sealing the open ends of the tubes to the mandrels, and vulcanizing the tubes while upon the mandrels and in the absence of external confining means solely by direct contact with water or a similar liquid heated to the desired temperature for vulcanization. (See group illustration.)

140. Laursen, 1,665,309. Apr. 10, 1928. The process of vulcanizing rubber tubes consists in rolling an uncured rubber sheet on a mandrel, applying rubber bands to the ends of the rolled sheet, softening the rolled sheet by subjecting it to a heat too low for vulcanization, submerging the softened rubber sheet in an inert liquid at a temperature too low for vulcanization, subjecting the liquid to a sufficient pressure to force the softened rubber into an intimate contact with the mandrel, releasing the pressure and removing the mandrel and rubber sheet from the liquid and subsequently vulcanizing the tube at the proper temperature.

141. Laursen, 1,665,310. Apr. 10, 1928. The method of vulcanizing rubber tubes consists in shaping an uncured piece of rubber stock about a former to create a tubular formation of the stock, placing the stock in a heater while on the former, subjecting the stock to low pressure to cause it to adhere closely to the former, submerging the rubber article in a liquid, causing circulation of the liquid with soapstone therein around the rubber article while submerged, and raising the liquid to a vulcanizing temperature for curing the article, maintaining the liquid and the article submerged therein under high pressure while the curing of the rubber article is being effected.

142. Laursen, 1,665,311. Apr. 10, 1928. The method consists in placing the tubes in a suitable receptacle, admitting into the receptacle, water or an equivalent liquid while heated to a vulcanizing temperature and under a pressure less than the final vulcanizing pressure, applying to the articles before they become set a pressure in excess of the temperature pressure, and maintaining the excess pressure until after the articles become set.

143. Auman, 1,668,390. May 1, 1928. This invention eliminates roughing the tube ends for splicing after the tubes are vulcanized and removed from the mandrel, by a method in which an end or the ends of a tube are roughened for splicing during vulcanizing the tube on the mandrel so that the tube ends are prepared for splicing or joining upon stripping or removal of the vulcanized tube from the mandrel. (See group illustration.)

144. Maynard, 1,669,260. May 8, 1928. Making a rubber tube comprises mounting it on a mandrel with a film of adhesive rubber between the tube and the mandrel at each end, trimming the tube to length by a shearing cut passing through the tube and rubber film at each end, whereby the tube is tightly sealed to the mandrel, and subjecting the tube to vulcanization in an atmosphere of heated fluid.

145. Gammeter, 1,670,445. May 22, 1928. Tube-making apparatus comprises a form adapted to support an annular band of tube-forming material and non-adhesive means thereon adapted to underlie the margins of a band of tube-forming material mounted thereon and to be lifted from the form to fold over the margins onto the middle portion of the band.

146. Mincher, 1,671,306. May 29, 1928. The method of forming a valve unit comprises positioning a valve stem provided at its base with an anchor plate upon one or more plies of raw rubber positioning a ply of fabric, aperture to receive the stem over the anchor plate and rubber plies, positioning one or more plies of rubber over the fabric and semi-curing the fabric and rubber plies in a mold of the desired shape.

147. Fisk, 1,672,858. June 5, 1928. The method of forming a flap tube comprises applying non-vulcanizable material to longitudinal edge portions of a fabric strip, applying rubber stripping longitudinally to the fabric strip and extending the stripping over the non-vulcanizable material and laterally beyond the edges of the fabric strip, shaping rubber into the form of a tube and placing a longitudinal portion of this tube against the rubber holding the stripping, fabric strip, and rubber tube in assembled relation, and vulcanizing the assembly while so held.

148. Fairchild, 1,673,353. June 12, 1928. A method of vulcanizing endless tubes includes injecting steam into the tube and swinging the tube during vulcanization to dislodge any deposit of water of condensation within the tube.

149. Semple, 1,674,526. June 19, 1928. The method of joining two ends of rubber tubing comprises sticking the end portions together and pressing them in a flattened condition while preventing adhesion of their inner walls by a thin and flexible, non-adhesive shield lying within and bridging the joint of the end portions. (See group illustration.)

150. Fleischli, 1,676,776. July 10, 1928. The method comprises passing plastic rubber between constantly rotating calender rolls to form a strip of sheet rubber, intermittently severing the strip at a point between its free end and the rotating rolls to provide sections of the length desired for tubes, intermittently advancing the free end of the strip with intervals of rest for the severing operations, advancing each of the sections ahead of the end from which it is severed, and shaping the sections into tubes during the intervals of rest.

151. Pade, 1,677,868. July 17, 1928. The apparatus comprises a resilient table upon which tubes may be rolled about mandrels, rails at the corners of the table adapted to support the mandrels, vertical bars at the ends of the rails forming stops against which the mandrel may come to rest, a conveyer and swinging hooks on the conveyer adapted to intersect the rail at the stop.

152. Melvin, 1,678,015. July 24, 1928. This method comprises tubing the stock to desired shape but of cross-sectional diameter less than that of the curing mandrel by an amount such that when the tube is stretched, the tendency to hug the mandrel is sufficient to prevent the penetration of the vulcanizing fluid between the tube and the mandrel; stretching the tube onto the mandrel, and subjecting it to vulcanization.

153. Hennessy, 1,682,124. Aug. 28, 1928. The method consists in forming the tube upon a mandrel, turning back the end portions of the tube, applying rubber cement over the turned back portion, replacing latter in original position, and vulcanizing.

154. Hennessy, 1,682,125. Aug. 28, 1928. The method consists in heating the end portions of the raw tube to soften the rubber and clamping these portions to the mandrel prior to vulcanization.

155. Henderson, 1,683,669. Sept. 11, 1928. The method of producing a laminated rubber tube consists in cutting a calendered rubber sheet on transverse lines to form strips of a width bearing a definite proportion to the circumference of the ultimate tube, placing the strips in series in end to end relation parallel with the length of a second calendered sheet, rolling the second sheet transversely to incorporate the series of strips, and finally vulcanizing.

156. Warner, 1,687,811. Oct. 16, 1928. The method of splicing together two tube ends of adhesive stock comprises so forcing together annular zones of the two as to cause them to adhere to each other in an annular seam of greater length than the normal circumference of either and in the same movement pinching off excess stock from the seam.

157. Coe, 1,693,636. Dec. 4, 1928. An endless tube is made by forming a length of tubing of unvulcanized rubber, turning the opposite ends of the tubing back over the body of the tubing, bringing the annular turns of opposite ends into alinement and simultaneously severing the tubes at the turns, and pressing the opposed severed ends together to cause them to adhere.

158. Coe, 1,693,637. Dec. 4, 1928. An apparatus for splicing hollow rubber articles into an endless form comprises means encircling each end of the hollow article and permitting portions of the open end of the article to be turned outwardly, and means for moving the first mentioned means together to join the ends of the hollow article in the form of an annular seam, the first mentioned means having relatively movable parts permitting removal of the endless article after seaming.

(To be continued)

Editor's Book Table

BOOK REVIEWS

"Elektrophorese, Elektro - Osmose, Elektrodialyse in Flussigkeiten." (Electrophoresis, Electro-osmosis, Electrodialysis in Fluids). By Drs. P. H. Prausnitz and J. Reitstötter. Published by Theodor Steinkopff, Dresden and Leipzig, Germany, 1931. Paper, 324 pages, 6 by 8¾ inches. Illustrated.

In this present volume of the Scientific Research Reports, of the Natural Science Series, the authors have endeavored to present both the scientific discoveries and observations as well as the technical inventions in the field of the electro-chemistry of colloids and to relate the trends of research work and methods in order to give an objective picture of the state of development of this branch of investigation.

In their selection of works and articles of which they have made use in this book, the authors have, on the whole, confined themselves to the most important of those that have appeared during the present century, up to November, 1930, while special attention has been paid to those works and articles of the last decade.

The work has been divided into five parts: I General, II Electrophoresis, III Electro-osmosis, IV Electrodialysis, and V Technical applications with special reference to patent literature. Mention is made, of course, of work in connection with Hevea latex and rubber, and in Part V we find listed a series of American and foreign patents with brief explanations, relating to electrical dispersions and depositions of rubber.

The value of the book is enhanced by a fairly extensive bibliography and separate indices of patents, authors, and subjects.

"Handbuch der Kautschuk und Asbest-Industrie." (Handbook of the Rubber and Asbestos Industry.) Edited by Walter Lindemann. Published by Atlas-Verlag Dr. Alterthum & Co., Berlin W. 15, Germany, 1931. Cloth, 320 pages, 6½ by 9¼ inches. Indexed.

For those desiring a list of German manufacturers of rubber and asbestos goods, together with details showing their status and the kind of goods produced, the present handbook of the rubber and asbestos industry should prove of value. No available information seems to have been left out and taking a firm at random we find given the full address, telegraphic address, telephone number, banking connections, year of organization, capital, directors, branches, articles manufactured, number of employes in office and factory.

By way of introduction, Walter Lindemann sketches the German and international rubber industry and the German asbestos industry. In addition to this resumé there is a review of the tariff relations between Germany and foreign countries, duties on imports, an index of firm names, buyers' guide, a list of trade names, and finally, illustrations of trademarks of German rubber goods manufacturers.

NEW PUBLICATIONS

"Lubrication of Royle Tubers, Strainers, and Insulating Machines." John Royle & Sons, Paterson, N. J. This 4-page bulletin specifies the correct type of lubricants for the various sizes of Royle tubers, with operating notes on lubrication. An oiling diagram for thrust bearing used on Nos. 1, 2, 3, and 4 machines, and the circulation oiling system employed on No. 5 machine are illustrated.

"C. P. and Reagent Chemicals." Pfaltz & Bauer, Inc., 300 Pearl St., New York, N. Y. This 1931 catalog of chemicals and laboratory supplies lists the finest products of the foremost manufacturers of these goods in Germany. The apparatus includes Sartorius balances, microtomes, and Spindler & Hoyer physical apparatus. The chemicals are E. De Haen C. P. and guaranteed reagents, also industrial and pharmaceutical.

"Handbook for the Use of Condor Belt." The Manhattan Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J. This brief pocket-sized handbook offers to the man in actual charge of belting a few suggestions for the selection, installation, and use of power belting. Under these heads much practical detailed help is given concerning horse power rating, splicing, lacing, sources of injury, and care of belting, also a suggested tabular record form for transmission belting.

"Quality Ticket Punches Catalog No. 5." The Hoggson & Pettis Mfg. Co., New Haven, Conn. In this catalog of 20 pages the manufacturers illustrate their numerous styles of hand punches for every purpose. These implements find daily use in various departments of rubber factories where indelible and unquestioned records and identifications are requisite.

"Hinson Survivo 'Rubber Equipped' Golf Bags, Tennis Racket Cases, and Golf Accessories." Catalog G-31. The Hinson Mfg. Co., Waterloo, Iowa. This twelve-page catalog attractively illustrates and describes the types of sporting equipment covered by the title.

"Gilmer-V Belts." L. H. Gilmer Co., Tacony, Philadelphia, Pa. This book of engineering data and price lists contains several chapters of text descriptive of the advantages of V-belt drives, uniform power transmission, durability of V-belts, fractional horsepower drives, multiple drives, and illustrations of numerous V-belt applications.

"Rex-Stearns Belt Conveyers." The Stearns Conveyer Co., Cleveland, O. This catalog and engineering data book contains complete and specialized information on the designs and applications of Rex-Sterns Timken idlers for all types of belt conveyers, together with all allied and auxiliary equipment necessary for complete belt conveyer installations.

"Catalog No. 26." Newark Wire Cloth Co., Newark, N. J. This catalog is worth reading and preserving by users of wire cloth either for screening, testing, or as a constituent in other manufactured products. Such people include rubber compounders and rubber goods manufacturers. The scope of the catalog covers how to order, select, and test wire cloth, and voluminous data on sizes, qualities, prices, etc.

"The Black Art of Compounding Chat No. 20." Binney & Smith Co., 41 E. 42nd St., New York, N. Y. No. 20 in this valuable series on practical compounding is devoted to the handling of Micronex in the rubber factory with special reference to the preparation of master batches both in the Banbury and on the roller mill. Uniformity of mixing is discussed. Pine tar, stearic acid, and Degras are preferred as softeners in the order in which they are named for the dispersion of carbon black in rubber mixings.

"Tentative Specifications for Cotton Rubber-Lined Fire Hose for Public and Private Fire Department Use." A. S. T. M. Designation: D 296—31 T. Published by American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa. This is the 1931 revision and covers 1½, 2, 2½, 3, and 3½ inch single, double, or triple-jacketed cotton rubber-lined fire hose suitable for use in public or private fire departments.

Market Reviews

Crude Rubber

New York Exchange

WHILE prices on the Rubber Exchange have moved rather widely in the past month, basic conditions are little changed. Foreign developments have had their influence on the market, but it has been more psychological than real.

Rubber statistics are still bearish. Production continues at a high rate, and consumption has shown little signs of improvement. Production figures for 615 estates show that the output for the first five months of this year was not curtailed in the slightest; it is far above that of last year when the May tapping holiday cut down the figure, but it is also above 1929, when there was no restriction on tapping activities.

The continued large output is hard to understand because several months ago it was believed that the prevailing low prices would surely force native producers to abandon their plantations. Each month since the first of the year traders have been expecting lower export figures from the producing countries, but each time they have been disappointed.

It may be that the lower prices to the natives merely meant that they must produce more rubber to get the same amount of money they secured when prices were higher. Costs have been cut sharply. One American consul estimates that rubber can be laid down in Singapore at 7½ cents by some producers.

A report[1] by E. G. Holt, Chief of the Rubber Division of the Department of Commerce, shows that exports of rubber goods have declined sharply in value; and he believes that production costs are still above market prices.

"This is causing high-cost low-yielding areas to be shut down," is his opinion, "and is gradually now reducing the volume of production. As yet, however, estates in Malaya continue to show outputs nearly as great as in 1930, while Dutch estate production thus far in 1931 is running ahead of 1930."

Week ended July 4. All positions sold over 7 cents at the close of last week, but dropped about 35 points on Monday morning. The level reached then was practically maintained for the entire week, with prices on July 3 at almost the same level they were on June 29.

The market was quiet, and trading light for the most part. Evening up on the week end in advance of the holiday, together with the expectation that the debt parley would be settled satisfactorily, gave the market a firm tone.

The Malayan shipment figures were slightly bullish, but the market paid little attention to them. Shipments totaled 39,397 tons during June, compared with 44,981 for May, and 36,657 for June, 1930. Estimates had been put at 41,000 tons, and the actual figures were the smallest so far this year.

The Census Bureau gave the May production of all types of automobiles as 315,115 units, compared with 335,708 in April, and 276,405 in March. Output for the first five months of 1931 was put at 1,319,016, compared with 1,864,074 in 1930.

It is also indicated from returns from forty states that registration of new passenger cars in the United States will be about 7 per cent less in May than in April. The total for May is estimated at 248,000 cars, compared with 265,732 for April and with 345,031 in May, 1930.

For the first five months of this year registrations dropped about 40 per cent from the 1,392,658 registered in the same period of 1930. The total number of cars titled in the first four months of the year was said to be 727,492, and 42,702 cars shipped abroad. The total of 770,194 cars compares with production of 838,557 cars for the same period. Many of these cars are for foreign assembly, and it is estimated that only about 30,000 cars have been added to stocks of dealers.

[1] See p. 61-62 this issue.

RUBBER BEAR POINTS

1. Export rubber business is much worse this year than last year according to E. G. Holt, of the Department of Commerce. In the first four months of 1931 the value of rubber goods exports declined 32.2 per cent.
2. Ceylon exports for June were 5,246 long tons, against 4,577 in June, 1930.
3. The working committee appointed by the Dutch Colonial Minister has failed to agree about a restriction plan.
4. United Kingdom stocks are over 25,000 tons larger than they were last year.
5. Production on 615 estates for the first five months of 1931 was reported to be 105,630 tons by the Rubber Growers' Association, compared with 89,917 in 1930 and 103,002 in 1929.
6. Registration of passenger vehicles for the first five months of 1931 is 40 per cent less than for the same period last year.
7. Exports from Malaya for July are estimated at 42,000 tons, compared with 39,200 in June and 44,200 tons during May.
8. Production of crude rubber on Malayan estates over 100 acres in size during June totaled 19,014 tons, against 18,904 in May; on estates less than 100 acres production was 16,663 tons, compared with 15,399 in May.
9. Dealers' stocks on June 30 were 16,647 tons, against 15,270 on May 31; estate stocks were 22,101 tons, against 21,901 at the end of May.

RUBBER BULL POINTS

1. Cost of rubber production at about 10 cents is still above market price.
2. Dutch native production was reduced 17 per cent in 1930, compared with 1929. They are now producing at only 50 per cent capacity.
3. Tire exports are holding up better than the average of rubber goods.
4. Only 15 per cent of the area applied for from 1926-1930 was granted by the F. M. S. Government for rubber production.
5. Six months' exports of rubber from Ceylon were 32,552 tons in 1931, compared with 37,402 tons in 1930.
6. Prices on high-quality tires have been boosted.
7. Tire shipments in May were 9.8 per cent above those in April and 3.8 per cent greater than in May, 1930.
8. On May 31 10,312,320 tires were on hand, an increase of 2.8 per cent over April 30, but a decrease of 23.2 per cent from May 31, 1930.
9. Inventories of cars in the hands of automobile dealers are at a minimum.
10. Several large automobile plants are continuing operations all summer with no "vacation," according to report.

The Rubber Exchange of New York, Inc.

DAILY MARKET FUTURES—RIBBED SMOKED SHEETS—CLEARING HOUSE PRICES—CENTS PER POUND—NO. 1 STANDARD CONTRACTS

Positions 1931	June, 1931 25	26	27	29	30	July, 1931 1	2	3	4*	6	7	8	9	10
June	6.45	....	....	....	....	....	....	....	....	....	....	....	....	....
July	6.50	6.85	7.06	6.65	6.94	6.63	6.65	6.77	....	6.66	6.63	6.53	6.40	6.55
Aug.	6.59	6.96	7.16	6.75	6.95	6.70	6.72	6.87	....	6.74	6.72	6.59	6.45	6.60
Sept.	6.70	7.07	7.26	6.85	6.96	6.78	6.80	6.95	....	6.83	6.80	6.65	6.50	6.65
Oct.	6.78	7.15	7.33	6.93	6.98	6.85	6.90	7.05	....	6.92	6.89	6.71	6.58	6.74
Nov.	6.88	7.24	7.39	7.02	7.08	6.95	7.00	7.14	....	7.00	6.97	6.81	6.67	6.83
Dec.	6.98	7.32	7.45	7.10	7.16	7.06	7.10	7.22	....	7.09	7.07	6.91	6.76	6.93
1932														
Jan.	7.04	7.38	7.51	7.16	7.20	7.13	7.17	7.28	....	7.16	7.14	6.98	6.83	6.99
Feb.	7.09	7.44	7.58	7.23	7.26	7.20	7.24	7.35	....	7.23	7.20	7.04	6.90	7.06
Mar.	7.15	7.50	7.65	7.30	7.30	7.28	7.30	7.42	....	7.31	7.28	7.11	6.97	7.13
Apr.	7.25	7.62	7.76	7.39	7.43	7.38	7.40	7.52	....	7.41	7.38	7.21	7.08	7.23
May	7.35	7.75	7.88	7.48	7.57	7.48	7.50	7.62	....	7.51	7.48	7.32	7.18	7.33
June	....	....	....	....	....	7.58	7.60	7.77	....	7.63	7.59	7.43	7.29	7.43

*Holiday.

Positions 1931	July, 1931 11	13	14	15	16	17	18	20	21	22	23	24	25	27
June	....	....	....	....	....	....	....	....	....	....	....	....	....	....
July	6.46	6.31	6.26	6.12	6.24	6.28	6.28	6.28	6.29	6.25	6.10	6.00	6.00	5.92
Aug.	6.52	6.37	6.34	6.22	6.34	6.33	6.33	6.32	6.32	6.27	6.12	6.04	6.02	5.96
Sept.	6.60	6.43	6.42	6.32	6.44	6.39	6.40	6.35	6.35	6.29	6.15	6.08	6.05	6.00
Oct.	6.68	6.48	6.48	6.39	6.51	6.47	6.46	6.42	6.42	6.35	6.21	6.15	6.10	6.08
Nov.	6.77	6.57	6.55	6.46	6.57	6.56	6.54	6.49	6.49	6.41	6.28	6.22	6.19	6.16
Dec.	6.85	6.67	6.63	6.53	6.64	6.64	6.60	6.57	6.56	6.48	6.35	6.30	6.29	6.24
1932														
Jan.	6.91	6.74	6.69	6.59	6.71	6.71	6.67	6.64	6.62	6.54	6.41	6.37	6.36	6.30
Feb.	6.98	6.81	6.76	6.66	6.78	6.78	6.74	6.71	6.69	6.61	6.48	6.44	6.43	6.36
Mar.	7.05	6.88	6.82	6.72	6.85	6.83	6.80	6.79	6.76	6.67	6.55	6.51	6.50	6.42
Apr.	7.15	6.98	6.91	6.81	6.94	6.94	6.90	6.89	6.86	6.77	6.65	6.59	6.58	6.51
May	7.25	7.08	7.00	6.90	7.06	7.04	7.00	6.99	6.96	6.87	6.76	6.68	6.66	6.60
June	7.35	7.18	7.10	7.00	7.14	7.14	7.10	7.09	7.06	6.97	6.86	6.78	6.76	6.70

An idea of how the F. M. S. are restricting rubber production is contained in a report by Lester Maynard, American Consul General at Singapore.

The report says in part: During the period 1926-1930, inclusive, no less than 1,164,420 acres were applied for by estates of 100 acres or over, and only 173,205 acres were granted, slightly less than 15 per cent. Of 74,865 acres applied for by estates of from 25 to 100 acres only 11,081 acres were granted, or slightly less than 15 per cent. Of 172,031 acres applied for by small holders whose landed area did not exceed 25 acres, 51,981 acres were granted, or approximately 30 per cent. Thus through administrative control a virtual restriction has been enforced on the planting of rubber on unalienated land.

Prices at the close of July 4 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
July	6.62	6.62	6.77	6.65
Aug.	...	...	6.87	6.72
Sept.	...	...	6.95/6.98	6.80
Oct.	6.91	6.91	7.05	6.90
Nov.	...	...	7.14	7.00
Dec.	7.22	7.05	7.22	7.10/7.14
Jan.	...	...	7.28	7.17
Feb.	...	...	7.35	7.24
Mar.	7.42	7.28	7.42	7.30/7.33
Apr.	...	...	7.52	7.40
May	7.60	7.60	7.62	7.50
June	...	...	7.77	7.60
Spot	...	...	6.75	6.65

Week ended July 11. The settlement of the Hoover debt proposal withdrew outside influence from the market, and rubber prices were expected to react to news directly concerning the market rather than to news from without the market.

An example was the fact that the rubber market remained rather steady during the week, while other commodity markets and the stock market were weak to a more or less serious degree.

The market did decline a bit for the week, but it was mostly in reponse to professional trading. Market news during the week apparently had been anticipated and did not draw any response from the market.

A portion from a circular issued by H. Hentz & Co. sums up the situation rather nicely: "We do not believe prices will decline appreciably from present levels, and on the other hand there appears to be little on which to base any expectation of a material rise in the immediate future. Production in the East has been maintained at a disappointingly high level and world stocks have been increasing steadily. An appreciable increase in consumption here as a result of generally improved business conditions in the future we feel is necessary before a sustained advance will be witnessed, and such a rise in consumption will be readily apparent when it eventuates."

United Kingdom stocks have been declining recently, but the large amount of rubber on hand is too unwieldly to be affected by small declines. It will take a long period before stocks are adjusted to anything like normal. Stocks there total over 136,000 tons, compared with about 108,000 last year, and last year's stocks were excessive.

Business is quiet in the automobile field, with manufacturers of low-priced cars reported as curtailing output to some extent.

Sales of all automobiles at the factory during May were reported to be 315,115, against 420,207 for May, 1930, according to Cram's automotive reports. Sales of passenger cars at the factory reached only 269,080 units for May, against 360,926 for May, 1930.

An announcement on Friday stated that the five leading tire companies had increased prices on white sidewall tires 2½ per cent, following a reduction of 5 per cent in third-line tires by a large mail order house. The white sidewall tire is a quality product selling at a little higher price than that of the ordinary walled tire.

Inventories of tires, according to the monthly report of the Rubber Manufacturers Association, totaled 10,312,320 units, an increase of 2.8 per cent over April 30, but a decline of 23.2 per cent from the inventory figure on May 31 1930. Tire shipments in May were 9.8 per cent higher than in April and higher than the usual seasonal increase.

Prices at the close of July 11 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
July	...	...	6.46	6.55
Aug.	...	...	6.52	6.60
Sept.	...	...	6.60	6.65
Oct.	...	...	6.68	6.74
Nov.	...	...	6.77	6.83
Dec.	6.85	6.85	6.85/6.88	6.93
Jan.	...	...	6.91	6.99
Feb.	...	...	6.98	7.06
Mar.	7.05	7.05	7.05	7.13
Apr.	...	...	7.15	7.23
May	...	...	7.25	7.33
June	...	...	7.35	7.43
Spot	...	...	6.55	6.55

RUBBER EXCHANGE ACTIVITIES
Transactions

Week Ended	Contracts Sold: Number	Contracts Sold: Tons	Transferable Notices	Week-End Tone
June 27.....	1,414	3,535.0	124	Very steady
July 4.....	599	1,497.5	168	Firm
July 11.....	604	1,510.0	5	Dull
July 18.....	601	1,502.5	55	Quiet
July 25.....	451	1,127.5	11	Quiet
Totals.....	3,669	9,172.5	363*	

*Actual deliveries of rubber.

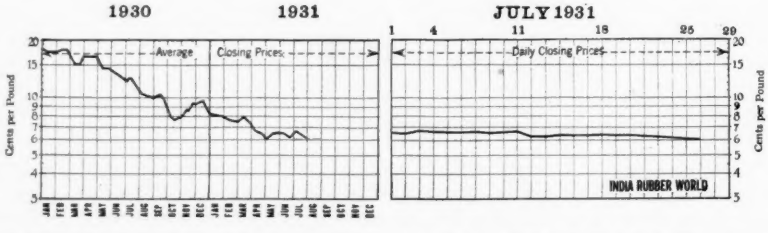
Week ended July 18. Following President Hoover's debt proposal the rubber market advanced substantially. During the early part of this week traders were taking advantage of that advance and selling rubber to take their profit. This fact, together with the difficulties that arose between Germany and France was responsible for a weaker market in the first half of the week, but it strengthened in the latter half when it was evident that Germany was struggling hard to overcome her financial troubles.

The net change for the week was a decline of about 20 points. Most of it was in sympathy with the action of other markets, in response to foreign news, and to hedge selling by Japanese importers.

Consumption figures published during the week put the June figure at 37,916 tons, compared with 37,817 in May. Arrivals increased 14,000 tons, and stocks on hand and afloat were almost unchanged.

The Department of Commerce reported that gross exports from Malaya during June amounted to 39,505 long tons, the lowest since October, 1928 (except June, 1930, when, because of the tapping holiday, exports were abnormally low.) Imports during the month of June were 12,115 tons, the highest since July, 1930.

Rubber exports from Ceylon for June amounted to 5,246 long tons, against 4,577 in June, 1930. For the six months of the present year, exports were 32,552 tons, compared with 37,402 in the same period last year.



New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets

New York Outside Market—Spot Closing Rubber Prices—Cents Per Pound

	June, 1931								July, 1931														
	22	23	24	25	26	27	29	30	1	2	3	4*	6	7	8	9	10	11	13	14	15	16	17	18
Ribbed Smoked Sheet....	6 3/8	6 1/8	6 3/8	6 1/2	6 3/4	7	6 3/4	6 7/8	6 5/8	6 5/8	6 3/4	...	6 5/8	6 5/8	6 5/8	6 1/2	6 1/2	6 5/8	6 1/2	6 3/8	6 1/4	6 3/8	6 3/8	6 3/8
No. 1 Thin Latex Crepe..	6 7/8	6 5/8	6 3/4	6 7/8	7 1/4	7 1/2	7 1/2	7 3/8	7 1/8	7 1/8	7 1/4	...	7 1/8	7 1/8	7 1/8	7	7	7 1/8	6 7/8	6 7/8	6 3/4	6 3/4	6 7/8	6 7/8
No. 1 Thick Latex Crepe.	6 5/8	6 3/8	6 1/2	6 3/8	6 7/8	7 1/8	6 7/8	7	6 3/4	6 3/4	6 7/8	...	6 3/4	6 3/4	6 3/4	6 3/4	6 3/4	6 7/8	6 5/8	6 5/8	6 1/2	6 1/2	6 1/2	6 1/2
No. 1 Brown Crepe	6 1/4	6	6 1/4	6 3/8	6 3/8	6 3/8	6 3/8	6 1/2	6 1/4	6 1/4	6 3/8	...	6 3/8	6 3/8	6 1/4	6 1/4	6 1/4	6 3/8	6 1/8	6 1/8	6 1/8	6 1/8	6	6
No. 2 Brown Crepe	6 1/8	5 7/8	6 1/8	6 1/4	6 1/4	6 1/2	6 1/4	6 3/8	6 1/8	6 1/8	6 1/4	...	6 1/4	6 1/4	6 1/8	6 1/8	6 1/8	6 1/4	6	6	6	6	5 7/8	5 7/8
No. 2 Amber	6 1/4	6	6 1/4	6 3/8	6 3/8	6 3/8	6 3/8	6 1/2	6 1/4	6 1/4	6 3/8	...	6 3/8	6 3/8	6 1/4	6 1/4	6 1/4	6 3/8	6 1/8	6 1/8	6 1/8	6 1/8	6	6
No. 3 Amber	6 1/8	5 7/8	6 1/8	6 1/4	6 1/4	6 1/2	6 1/4	6 3/8	6 1/8	6 1/8	6 1/4	...	6 3/8	6 3/8	6 1/4	6 1/8	6 1/8	6 1/4	6 1/8	6 1/8	6	6	6	6
No. 4 Amber	6	5 3/4	6	6 1/8	6 1/8	6 3/8	6 1/8	6 1/4	6	6	6 1/8	...	6 1/4	6 1/4	6 1/8	6	6	6 1/8	6	6	5 7/8	5 7/8	5 7/8	5 7/8
Rolled Brown	5 3/4	5 5/8	5 7/8	6	6	6 1/4	6	6 1/8	5 7/8	5 7/8	6	...	6 1/8	6 1/8	6	5 7/8	5 7/8	6	5 7/8	5 7/8	5 3/4	5 3/4	5 3/4	5 3/4

* Holiday.

June exports from Netherlands East Indies were estimated at 13,650 tons by the estates, and 8,550 tons by the natives.

According to a cable received from Amsterdam by the Rubber Exchange of New York, the working committee recently appointed by the Dutch Colonial Minister to study the rubber situation and devise a means of aiding the industry has published its report.

The investigators inform the Colonial Office that they have been unable to agree unanimously on any definite plan for restricting rubber production. It is suggested by some members that restriction take place in a natural way, while other members hold that the governments of the various producing countries must give assistance to the industry.

Traders took the view that this lack of agreement among the members of the committee was a sign that restriction efforts would be abandoned entirely. The same opinion is held in London where traders feel that artificial restriction would not be an effective method for curing the ills of the rubber industry.

Prices at the close of July 18 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
July	...	...	6.28	6.28
Aug.	...	...	6.33	6.33
Sept.	6.40	6.40	6.40	6.39/6.44
Oct.	...	...	6.46	6.47
Nov.	...	...	6.54	6.56
Dec.	6.66	6.60	6.60	6.64
Jan.	...	...	6.67	6.71
Feb.	...	...	6.74	6.78
Mar.	6.82	6.80	6.80	6.83/6.85
Apr.	...	...	6.90	6.94
May	...	...	7.00	7.04
June	...	...	7.10	7.14
Spot	...	...	6.30	6.25

Week ended July 25. Dullness prevailed in the rubber market for most of the week. Only a few lots were traded on each of the first three days, and prices slipped downward gradually to the 6-cent level.

The market assumed a waiting attitude in reference to developments in Germany; and when final negotiations were over, the market took a bearish view of the accomplishments. The market closed the week on a downward trend.

Statistics coming to hand during the week added nothing to the cheerful side of the picture. Production on estates less than 100 acres in Malaya was 16,663 tons for June, compared with 15,399 tons during May. The output of estates over 100 acres in size reached a total of 19,014 tons, compared with 18,904 tons during the month previous.

Stocks of the commodity also were larger at the close of the month, those on estates amounting to 22,101 tons, against 21,901 at the close of May; while rubber in dealers' hands aggregated 19,948 tons, in comparison with 18,393 tons at the end of the previous month.

Preliminary estimates indicate a total export figure from Malaya of 42,000 tons for the month of July, compared with 39,300 tons during June, and with 44,200 tons during May.

Under the weight of these statistics it is no wonder that the market was bowed down. The continued heavy production figures and low consumption can lead to only one result—lower prices. In spite of all the talk about ruinous prices, producers are maintaining their excessive schedules. It seems that producers are cutting costs to figures which they would not have thought possible a few years ago, and many estates are probably satisfied if they break even. It is repeatedly stated, on the other hand, that no more land is being allocated to production and

New York Quotations

Following are New York outside market rubber quotations for one year ago, one month ago, and July 27, the current date

Plantation Hevea	July 26, 1930	June 26, 1931	July 27, 1931
Rubber latex (Hevea)..gal.	$1.00 @	$0.75 @	$0.75 @
Sheet			
Ribbed, smoked, spot	.10¾@.10⅞	.06¼@.06⅜	.06⅛@
August	.10⅞@	.06⅜@	.06⅛@
August-September	.10⅞@.11	.06⅜@.06⅝	.06¼@
October-December	.11¼@.11⅜	.06⅝@.06⅞	.06⅜@
January-March	.11¾@.11⅞	.06⅞@.07⅛	.06⅝@
CREPE			
No. 1 Thin latex (first latex) spot	.11¼@.11½	.06⅞@.07	.06⅝@
August	.11½@	.07 @	.06⅝@
August-September	.11⅜@.11½	.07⅛@.07⅜	.06¾@
October-December	.11¾@.11⅞	.07¼@.07½	.06⅞@
January-March	.12¼@.12⅜	.07½@.07¾	.07⅛@
No. 2 Amber, spot ("B" blanket)	.10¼@	.06⅛@.06⅜	.06 @
August	.10 @.10¼	.06⅜@	.06 @
August-September	.10¼@.10⅜	.06¼@.06½	.06⅛@
October-December	.10½@.10¾	.06½@.06⅝	.06¼@
January-March	.11 @.11¼	.06⅝@.06¾	.06½@
No. 3 Amber, spot ("C" blanket)	.09¾@.10	.06 @.06¼	.05⅞@
No. 1 Brown, clean, light thin	.10¼@	.06⅛@.06⅜	.06 @
No. 2 Brown, clean, thin	.09⅞@.10	.06 @.06¼	.05⅞@
Brown, roll	.08⅜@.08½	.05¾@.06	.05⅝@
East Indian			
PONTIANAK			
Banjermasin	.07 @	.06 @	.06 @
Pressed bock	.12½@.13	.10 @	.09 @
Sarawak	.07 @	.06 @	.06 @
South American			
PARAS			
Upriver, fine	.13 @	.08⅜@	.08⅜@
Upriver, fine	*.17¾@	*.11¼@	*.11 @
Upriver, coarse	.06 @	@	@
Upriver, coarse	*.12 @	*.07⅝@	*.07½@

South American	July 26, 1930	June 26, 1931	July 27, 1931
PARAS—*Continued*			
Islands, fine ....*gal.*	$0.14 @	$0.08 @	$0.08 @
Islands, fine	*.17½@	*.11 @	*.11½@
Acre, Bolivian, fine	.13½@	.08⅝@	.08¾@
Acre, Bolivian, fine	*.18 @	*.11½@	*.12¾@
Beni, Bolivian	.13½@	.08⅝@	.09 @
Madeira, fine	.13 @	.08⅜@	.08½@
CAUCHO			
Upper caucho ball	.06 @	@	@
Upper caucho ball	*.12 @	*.07⅝@	*.07½@
Lower caucho ball	.05½@	@	@
Manicobas			
Ceará, negro heads	†.14 @	@	@
Ceará scrap	†.08 @	@	@
Manicoba, 30% guaranteed	†.16 @	†.05 @	†.05 @
Mangabiera, thin sheet	†.16 @	†.05 @	†.05 @
Guayule			
Duro, washed and dried	.16 @	.14 @	.14 @
Ampar	.17 @	.15 @	.15 @
Gutta Percha			
Gutta Siak	.13½@	.10½@	.10½@
Gutta Soh	.25 @	.19 @	.18 @
Red Macassar	2.00 @2.10	1.75 @	1.80 @
Balata			
Block, Ciudad Bolivar	.41 @	.26½@	.27 @
Colombia	†.36½@	@	@
Manaos block	.44 @	.28 @	.28 @
Surinam sheet	.60 @	.52 @	.50 @
Amber	.62 @	.54 @	.52 @

* Washed and dried crepe. Shipment from Brazil.
† Nominal.

New York Outside Market (Continued)

	July, 1931					
	20	21	22	23	24	25
Ribbed Smoked Sheet	6⅜	6⅜	6¼	6⅛	6 1/16	6 1/16
No. 1 Thin Latex Crepe	6⅞	6⅞	6¾	6⅝	6⅝	6⅝
No. 1 Thick Latex Crepe	6½	6½	6½	6⅜	6¼	6¼
No. 1 Brown Crepe	6	6	6⅛	6	5⅞	5⅞
No. 2 Brown Crepe	5⅞	5⅞	6	5⅞	5¾	5¾
No. 2 Amber	6	6	6⅛	6	5⅞	5⅞
No. 3 Amber	6	6	6	5⅞	5⅞	5⅞
No. 4 Amber	5⅞	5⅞	5⅞	5¾	5¾	5¾
Rolled Brown	5¾	5¾	5⅞	5⅝	5⅝	5⅝

Low and High New York Spot Prices

	July					
PLANTATIONS	1931*		1930		1929	
Thin latex crepe	$0.06⅝@	$0.07¼	$0.10⅞@	$0.12¾	$0.21¾@	$0.23½
Smoked sheet, ribbed	.06 1/16@	.06¾	.10⅜@	.12¼	.20⅝@	.22½
PARAS						
Upriver fine	.08 @	.08¾	.13 @	.14¼	.21¾@	.22½
Upriver coarse	Nominal		.06½@	.07¼	.11½@	.12¾
Upper caucho ball	Nominal		.06½@	.07¼	.11½@	.12¾

* Figured to July 27, 1931.

that many estates have been abandoned.

Automobile production is being curtailed because of the lack of demand during the summer. There is no general trend among the various manufacturers since some are increasing production, as in the case of the manufacturer who introduced a new model into the low priced field, while others are cutting down their schedules, with some planning to shut down entirely for a few weeks to allow sales to catch up with output. Little has been seen or heard as yet of the replacement demand expected in tires.

Prices at the close of July 25 on No. 1 Standard contract, were:

Position	High	Low	Close	Previous Close
July	...	...	6.00	6.00
Aug.	...	...	6.02	6.04
Sept.	...	...	6.05	6.08/6.12
Oct.	6.11	6.11	6.10	6.15
Nov.	...	...	6.19	6.22
Dec.	6.29	6.27	6.29	6.30
Jan.	...	...	6.36	6.37
Feb.	..	...	6.43	6.44
Mar.	6.50	6.47	6.50	6.51
Apr.	...	...	6.58	6.59
May	6.66	6.66	6.66	6.68
June	...	...	6.76	6.78
Spot	...	...	6.03	6.05

On July 27 the market was quiet. All positions closed slightly lower than on July 25 for No. 1 Standard contracts, of which sales were made as follows: July, 5.92; December, 6.24; March, 6.42; May, 6.60.

Price Differentials

Price differentials between the various grades of plantation rubber which shall prevail on all deliveries against the old "A" contracts, for August, 1931, are: off quality first latex crepe at one-tenth of a cent (.1c.) per pound; good f. a. q. ribbed smoked sheets at twenty-five one-hundredths of a cent (.25c.) per pound; ordinary f. a. q. ribbed smoked sheets at four-tenths of a cent (.4c.) per pound.

N. Y. Outside Market

The confidence felt early in the month, and the low prices in the latter half brought manufacturers into the market; so there was a fair amount of factory buying.

The belief still exists, however, that there is no rush to fill requirements because the outlook is for prices to remain at present levels for some time to come. Stocks on hand both here and abroad are unwieldy, and consumers are wary of buying.

The tire industry seems to be as well situated as any. A few manufacturers of high-quality tires even went so far as to boost their prices; while exports of tires are showing up better than the average for other rubber products.

Tire inventories are over 20 per cent below those of last year, and May shipments were better than in April and in the same month last year.

Business as a whole does not seem to have turned the corner, and President Hoover's request that expenditures in all government departments be curtailed sharply seems to indicate that he expects no change in the outlook for some time.

Week ended July 4. Actuals ended firm in the face of the holiday, but traders seemed to pay more attention to outside influences than those within the market. The stock market and the outcome of negotiations between France and the United States in reference to suspension of debt payments influenced the market more than did the lower shipments from Malaya.

When the market rallied last week, taking prices over 7 cents, it was thought that the change was due to industrial and statistical improvement—that the prices which had remained below production costs for so long had taken a definite turn for the better.

Events in the last week did not seem to justify that opinion. Prices were firm at slightly lower levels, but consumers did not buy rubber in any considerable quantity. The automobile figures showed that production here was lower in May than in April, and registrations were below production.

Some traders are expecting that July consumption will drop because of curtailment in several tire factories owing to seasonal curtailment, but these predictions were lost sight of in the face of more stirring news from the stock market and from the debt parley.

Prices at the close of July 4 were:

Spot	July 4	Month Ago	Year Ago
Crepe	7¼	6¾	12½
Ribs	6¾	6½	12⅝
Upriver fine	8¾	8¼	14¼

Week ended July 11. A good deal of rubber was bought by factory interests on one or two days of the week, but most of the purchases and sales were by speculators on the changes in the market. A restricted amount of offerings lent a steadier undertone to the market, and dealers are said to be holding out for the prices they ask.

Rubber shipments from Malaya decreased during June, but the decline is usually expected in June. Ceylon shipments seemed to indicate that rubber is still being produced at high rates, for June shipments were 5,242 tons, against 4,535 tons in May, and 4,848 tons in June, 1930.

The Department of Commerce adds to the figures given on the production on 615 estates during the first four months, and includes May figures. Crop returns for the first five months of 1931 show a production of 105,630 tons, compared with 89,917 in 1930, and 103,002 in 1929. The small figure in 1930 was due to the May tapping holiday last year. So 1931 production is still far in advance of needs.

Prices at the close of July 11 were:

Spot	July 11	Month Ago	Year Ago
Crepe	7⅛	6½	11⅝
Ribs	6⅜	6⅛	11
Upriver fine	8¼	8⅛	14

Week ended July 18. Some buying was in evidence on the decline registered Wednesday, but for the most part buyers are holding off. No one knows how the financial situation in Germany will be solved, and traders are inclined to assume a waiting attitude.

Consumption figures for June seemed to have no influence on the market, although they were slightly higher than for May. June figures were 37,916 tons, compared with 37,817 in May.

An address by E. G. Holt, of the Rubber Division of the Department of Commerce, contained encouraging facts showing that the expense of rubber production, although reduced to levels deemed impossible in former years, was still above market prices.

After declaring that the "average well-run Malayan estates produced at an average total out-of-pocket expense not much above 10 cents a pound," Mr. Holt went on to say: "But the average expense is at present above the market price for first quality rubber. This is causing high-cost low-yielding areas to be shut down and is gradually now reducing the volume of production. As yet, however, estates in Malaya continue to show outputs nearly as great as in 1930, while Dutch estate production thus far in 1931 is running ahead of 1930."

Prices at the close of July 18 were:

Spot	July 18	Month Ago	Year Ago
Crepe	6⅞	6⅝	11¼
Ribs	6⅜	6⅛	10⅞
Upriver fine	8½	8¼	13½

Week ended July 25. The market has reversed its steady trend of the last few weeks, and prices in the last six days have declined in a dull market to record lows in a few deliveries in late months.

The declines have brought in a number of factory buyers, and sales in the outside market were said to be fairly good in the last week. On almost every dip buyers come into the market, and this week has been no exception.

The weaker tone has been partly in sympathy with a weaker market in London and Singapore. Foreign news has affected the markets in those quarters, with traders taking a pessimistic view of the latest efforts to help Germany out of her difficulties.

While Malayan production figures were bearish, it is estimated that London and Liverpool stocks will show a decline of 1,200 tons on Monday so the shipments must have been absorbed rather well, at least by the British traders.

An encouraging statement was published in the *Herald Tribune* on July 24 as follows: "Six important automobile plants, which a year ago had insufficient business to keep them going and were forced to shut down, are enjoying sufficient demand for their products to dispense with "vacations" this summer, it was announced yesterday. The companies are Chevrolet, Auburn, Studebaker, Pierce-Arrow, Federal and Durant.

"The announcements were in conflict with recent reports indicating rather widespread shutdowns and were interpreted as reflecting a much improved volume of business in automotive lines."

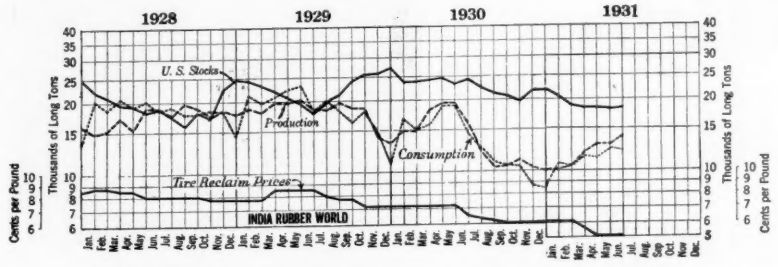
Consumption during June was 34,883 tons. Shipments from Malaya for July were estimated at 42,000 tons.

Prices at the close of July 25 were:

Spot	July 25	Month Ago	Year Ago
Crepe	6⅝	6⅞	11¼
Ribs	6⅛	6½	10¾
Upriver fine	8¼	8½	13¼

Excessive domestic and foreign stocks and moderate rate of consumption combine to restrict factory interest in crude rubber to actual needs. Rubber growers are not selling futures at the present market because it would simply be seeking losses in advance. Spot was obtainable on July 27 at 6 cents or better.

Reclaimed Rubber

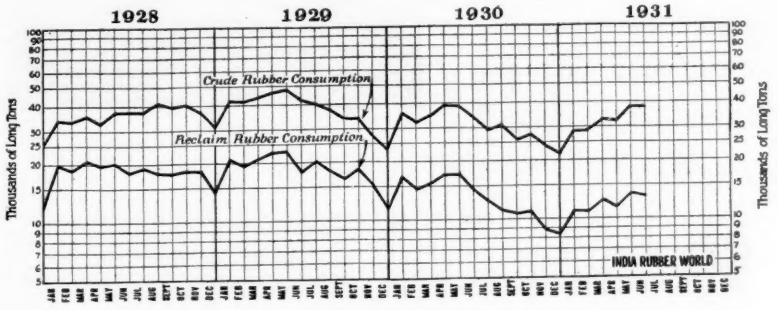


Production, Consumption, Stocks, and Price of Tire Reclaim

PRODUCTION of reclaim was slightly more in June than in May. There has thus been a slow yet perceptible increase in output since January 1. The total increase in that period amounts to 3,606 tons. Consumption also has increased in the same period but only two-thirds as rapidly. June consumption was 13,045 tons as compared with 13,103 tons in May. The ratio of consumption of reclaim to crude was 34.4 per cent virtually the same as that in May when it showed 34.6 per cent.

Demand for reclaim from rubber goods manufacturers has not lessened. They evidently fully realize its distinct value and advantages as a compounding ingredient. This appreciation is seen in the steady upward trend of consumption statistics for the first six months of this year during which period crude rubber has been sinking from 9- to 6-cent levels.

Given the return of better business conditions reclaim will continue to increase in volume of sales on its own merits regardless of the price of crude rubber. In other words the stagnancy of the present industrial situation is holding down the consumption of reclaim rather than any influence of low priced crude rubber.



Crude and Reclaimed Rubber Consumption

Evidence is accumulating that in certain branches of rubber goods manufacturing the tendency is strong to increase the percentage of reclaim. For example, in wire insulation some manufacturers have sought to reduce or even eliminate reclaim from their stocks. The practical results of this attempt showed that it was essential to restore a liberal percentage of reclaim to give body to the composition both before and after tubing.

The quality and the abundance of the current fruit crop has stimulated preserving and brought an unusually large demand for jar rings. The reclaiming industry has, consequently, experienced a good trade in red reclaim grades.

The nominal quotations reported below for standard reclaims remain unchanged from those recorded last month with the single exception of wasned shoe, which has been reduced ¼-cent.

New York Quotations

July 27, 1931

High Tensile	Spec. Grav.	Price Per Pound
Super-reclaim, black	1.20	$0.06¾ @ $0.07
red	1.20	.06½ @ .06¾
Auto Tire		
Black	1.21	.05 @ .05¼
Black selected tires	1.18	.05¼ @ .05½
Dark gray	1.35	.06½ @ .06¾
White	1.40	.07½ @ .07¾
Shoe		
Unwashed	1.60	.05¾ @ .06
Washed	1.50	.07 @ .07¼
Tube		
No. 1	1.00	.08 @ .08¼
No. 2	1.10	.06½ @ .06¾
Truck Tire		
Truck tire, heavy gravity	1.55	.06 @ .06¼
Truck tire, light gravity	1.40	.06¼ @ .06½
Miscellaneous		
Mechanical blends	1.60	.04½ @ .05

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*	Exports
1925	132,930	137,105	35.6	13,203	4,571
1926	180,582	164,500	45.9	23,218	5,391
1927	189,144	178,471	47.6	24,980	8,540
1928	208,516	223,000	50.4	24,785	9,577
1929	219,057	224,253	47.9	27,464	12,721
1930	157,967	153,497	41.5	24,008	9,468
1930					
January	13,902	15,766	45.8	24,241	954
February	14,676	14,012	45.5	24,241	1,203
March	16,115	14,669	43.2	24,415	1,048
April	16,511	16,269	43.0	24,592	740
May	16,496	16,411	43.7	23,356	939
June	14,581	13,534	41.6	24,484	641
July	11,411	11,918	42.3	22,477	778
August	11,158	11,321	35.9	21,636	807
September	10,588	10,787	41.4	20,704	656
October	11,437	11,038	39.3	19,912	572
November	10,895	9,075	37.5	22,000	437
December	10,197	8,697	39.3	22,000	693
1931					
January	10,460	11,003	37.6	20,466	649
February	10,871	10,800	37.5	18,878	625
March	12,938	12,524	38.2	18,375	752
April	13,267	11,745	35.2	18,356	577
May	13,478	13,103	34.6	18,088	798
June	14,066	13,045	34.4	18,505	703

*Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.

May Tire Statistics

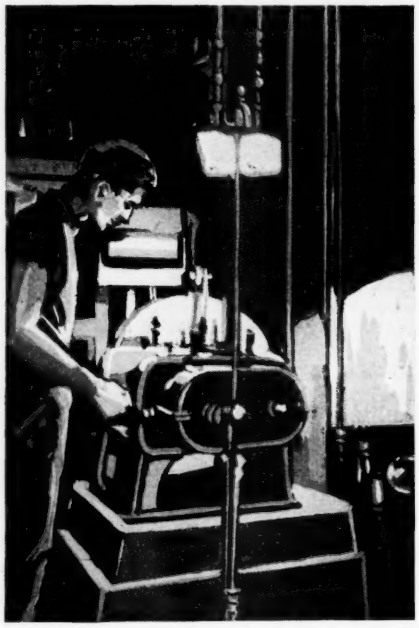
Shipments of pneumatic casings for May amounted to 5,415,171 casings, an increase of 9.8 per cent over April this year, 3.8 per cent over May, 1930, and 6.8 per cent more than the usual seasonal increase of 3 per cent, according to R. M. A. statistics.

Production of pneumatic casings for May were 5,678,754 units, an increase of 14.9 per cent over April this year, although showing very little change as compared with May a year ago.

Pneumatic casings on hand May 31 amounted to 10,312,320 units, an increase of 2.8 per cent over April, but 23.2 per cent below May 31, 1930. The actual figures are as follows:

	Shipments	Production	Inventory
May, 1931	5,415,171	5,678,754	10,312,320
Apr., 1931	4,931,906	4,944,363	10,031,419
May, 1930	5,216,471	5,717,369	13,431,736

The High Cost of Leadership



"In times of depression as well as during periods of general prosperity, we will continue to utilize the best available methods of control, and will leave no stone unturned in our endeavor to continue to refine and tighten our specification limits."

*—From "Twenty Years With MICRONEX"**

DISTRESS prices invite compromise with control standards. Our determination to safeguard the enviable reputation of MICRONEX surmounts all considerations of expense. We have tested this policy more than once and believe it explains why more tires continue to be made with MICRONEX than any other black. » » » »

*If you have not seen this interesting little booklet on the development of MICRONEX, the world's standard gas black, let us send you one or more copies.

BINNEY & SMITH CO.

41 EAST 42nd STREET • NEW YORK, N. Y.

Compounding Ingredients

RUBBER goods production in the tire and tube division of the industry increased markedly in July with the output estimated at about 80 per cent of capacity. Production is based more on tire replacement demand than on that for original equipment. Mechanical goods, heel, and sole production is reported as fair to good. Footwear, auto topping, and insulated wire are rather quiet. Consumption of compounding materials is steady and seasonal with volume of movement large.

The newest compounding ingredients announced are colloidal zinc oxide and colloidal sulphur, both of which are designed for latex compounding.

ACCELERATORS. The well-known favorite brands of organic accelerators still maintain their popularity. The newest candidate for favor is the Thionex-Barak combination providing a group of desirable curing features.

AGE RESISTERS. Chemical manufacturers are supplying a complete line of age resisters adapted practically to eliminate deterioration due to every condition that induces loss of resilience or elastic quality.

CARBON BLACK. The demand is heavy and steady for standard rubber carbon black because of the increased output of tires in the past few weeks. The base price for carload lots holds steady at 3 cents a pound, f. o. b. Texas.

LITHARGE. The last of June, two advances of ¼-cent each took effect on the commercial grade in casks. Deliveries are seasonal.

LITHOPONE. This commodity is sold to large consumers principally by contracts effected mostly in the Spring. The price is therefore very steady throughout the year.

SOFTENERS. The popular softeners, pine tar, powdered stearic acid, and Degras, are all in steady demand for their excellent dispersing effect particularly for carbon black compounding. Mineral Rubber and other softeners hold their popularity for general work.

SOLVENTS. Both heavy and light grades have held unchanged in price in seasonal movement.

ZINC OXIDE. In June increased demand was indicated, which materialized in July when consumption became steady and in good volume.

New York Quotations

July 27, 1931

Prices Not Reported Will Be Supplied on Application

Abrasives			
Marble flour	ton	$18.00 @	$25.00
Pumice stone, pwd.	lb.	.02½ @	.04
Rottenstone, domestic	ton	23.50 @	28.00
Rottenstone, English	lb.	.03¾ @	
Silica	lb.	.01½ @	.05
Accelerators, Inorganic			
Lead, carbonate	lb.	.07¼ @	
red	lb.	.07¾ @	
sublimed blue	lb.	.06¾ @	
sublimed white	lb.	.06¾ @	
super-sublimed white	lb.	.06¾ @	
Lime flour, hydrated	ton	20.00 @	
Litharge, casks	lb.	.06¾ @	
Magnesia, calcined, heavy	lb.	.04 @	
carbonate	lb.	.06 @	.07
Orange mineral A.A.A.	lb.	.09¾ @	
Accelerators, Organic			
A-1	lb.	.22 @	.27
A-5-10	lb.	.31 @	.36
A-7	lb.	.55 @	.65
A-11	lb.	.62 @	.75
A-16	lb.	.57 @	.65
A-19	lb.	.58 @	.75
A-32	lb.	.70 @	.75
Accelerator 49	lb.	.35 @	.42
Aldehyde ammonia	lb.	.65 @	.67
Altax	lb.	@	
Barak	lb.	@	
BLE	lb.	@	
Butene	lb.	@	
Captax	lb.	@	
Crylene	lb.	@	
paste	lb.	@	
DBA	lb.	@	
Di-esterex N.	lb.	@	
Di-ethyl-amine, 100%	lb.	@	
DOTG	lb.	.42 @	.43
DPG	lb.	.30 @	.31
Ethylidine aniline	lb.	.45 @	.46
Formaldehyde aniline anhydro	lb.	.37½ @	.38½
Grasselerator 808	lb.	@	
833	lb.	@	
Heptene	lb.	@	
base	lb.	@	
Hexamethylenetetramine	lb.	.58½ @	.59½
Hydrone	lb.	@	
Lead oleate, No. 999	lb.	.12¾ @	
Witco	lb.	.15 @	
Lithex	lb.	@	
Methylene dianiline	lb.	.37½ @	.38½
Monex	lb.	@	
Novex	lb.	@	
Phenex	lb.	.65 @	.70
Pipsol	lb.	4.00 @	4.50
Plastone	lb.	@	
R-2	lb.	1.75 @	2.15
base	lb.	4.50 @	5.00
R & H 40	lb.	.40 @	.41
50	lb.	.40 @	.41
50-D	lb.	.40 @	.41
397	lb.	.75 @	.76
Retardex	lb.	.50 @	
Safex	lb.	@	
SPDX	lb.	.70 @	.75
Super-sulphur No. 1	lb.	@	
No. 2	lb.	@	
Tensilac 39	lb.	.40 @	.42½
Thermlo F	lb.	@	
Thiocarbanilid	lb.	.20 @	.22
TMTT	lb.	3.00 @	3.25
Trimene	lb.	@	
base	lb.	@	
Triphenyl guanidine	lb.	.58 @	.60
Tuads	lb.	@	
Ulto	lb.	$3.00 @	
Ureka	lb.	.70 @	1.00
ZBX	lb.	@	
Z-88-P	lb.	.50 @	.60
Zimate	lb.	@	
Acids			
Acetic 28% (bbls.)	100 lbs.	2.60 @	2.85
glacial (carboys)	100 lbs.	9.73 @	9.98
Sulphuric, 66°	ton	15.50 @	
Age Resisters			
Age-Rite Gel	lb.	@	
powder	lb.	@	
resin	lb.	@	
white	lb.	@	
Albasan	lb.	@	
Antox	lb.	@	
Oxynone	lb.	.68 @	.90
Resistox	lb.	.54 @	.65
Stabilite	lb.	.57 @	.62
Alba	lb.	.70 @	.75
VGB	lb.	@	
Zalba	lb.	@	
Alkalies			
Caustic soda, 76% solid	100 lbs.	2.60 @	
Antisun Materials			
Heliozone	lb.	@	
Sunproof	lb.	@	
Binders, Fibrous			
Cotton flock, dark	lb.	.09½ @	.12
dyed	lb.	.50 @	.80
white	lb.	.11 @	.17
Colors			
BLACK			
Bone	lb.	.07½ @	
Carbon (see Reenforcers)			
Drop (bbls.)	lb.	.05½ @	.15
Lampblack (commercial)	lb.	.07 @	.08
BLUE			
Blue toners	lb.	.60 @	3.85
Brilliant blue	lb.	3.50 @	
Prussian	lb.	.35 @	.37
Ultramarine	lb.	.06 @	.30
BROWN			
Iron oxide	lb.	@	
Mapico	lb.	.17 @	
Sienna, Italian, raw	lb.	.04½ @	.11
GREEN			
Brilliant green	lb.	3.50 @	
Chrome, light	lb.	.23 @	.25½
medium	lb.	.26 @	.27½
Chromium oxide	lb.	.25 @	.32
Dark green	lb.	1.30 @	
Green toners	lb.	1.00 @	3.60
Light green	lb.	.70 @	
ORANGE			
Cadmium sulphide	lb.	.60 @	.70
Orange lake	lb.	.50 @	
Orange toners	lb.	1.60 @	
ORCHID			
Orchid toners	lb.	1.05 @	1.75
PINK			
Pink toners	lb.	1.00 @	1.80
PURPLE			
Permanent purple	lb.	1.80 @	
Purple toners	lb.	.60 @	1.90
RED			
Antimony Crimson, R. M. P. No. 3	lb.	.48 @	
Sulphur free	lb.	.52 @	
7-A	lb.	.35 @	
Z-2	lb.	.20 @	
Cadmium	lb.	@	
Chinese red	lb.	.85 @	
Crimson red	lb.	.85 @	
Iron Oxides bright pure domestic	lb.	$0.09½ @	$0.12
bright pure English	lb.	.11 @	
bright reduced English	lb.	.08 @	
bright reduced domestic	lb.	.04 @	.08
Indian (maroon), pure domestic	lb.	.09½ @	.12
Indian (maroon), pure English	lb.	.09¾ @	
Indian (maroon), reduced English	lb.	.08 @	
Indian (maroon), reduced domestic	lb.	.03 @	.08½
Mapico	lb.	.09 @	
Medium red	lb.	.85 @	
Oximony	lb.	@	
Red toners	lb.	.95 @	2.75
Rub-er-red	lb.	.08¾ @	
Scarlet red	lb.	1.50 @	
Spanish red oxide	lb.	.02½ @	
Sunburnt red	lb.	.14 @	
Venetian red	lb.	.01½ @	
WHITE			
Lithopone	lb.	.04¾ @	.05
Albalith	lb.	.04½ @	.05
Azolith	lb.	.04½ @	.05
Cryptone	lb.	.06½ @	.07
Grasselli (50 lb. bags)	lb.	.04½ @	.04¾
(400 lb. bbls.)	lb.	.04¾ @	.05
Titanium oxide, pure	lb.	.20 @	
Titanox "B"	lb.	.06½ @	.07
"C"	lb.	.07 @	.07½
Zinc Oxide AAA (lead free)	lb.	.06½ @	.07
Azo (factory): ZZZ (lead free)	lb.	.06½ @	.07
ZZ (leaded)	lb.	.06¼ @	.06¾
Z (8% leaded)	lb.	.06¼ @	.06¾
Green seal	lb.	.10¾ @	.10¾
Green seal, Anaconda	lb.	.10¾ @	.10¾
Kadox, black label	lb.	.10¾ @	.10¾
blue label	lb.	.09¾ @	.09¾
red label	lb.	.08 @	.08½
Red seal	lb.	.09¾ @	.09¾
Red seal, Anaconda	lb.	.09¾ @	.09¾
Special	lb.	.07 @	.07½
White seal (bbls.)	lb.	.11¾ @	.11¾
White seal, Anaconda	lb.	.11¾ @	.11¾
XX green	lb.	.07 @	.07½
XX red	lb.	.06½ @	.07
Zinc sulphide (bbls.)	lb.	.15 @	.15¼
YELLOW			
Cadmium sulphide	lb.	.65 @	.75
Chrome	lb.	.16½ @	
Lemon yellow	lb.	1.50 @	
Mapico	lb.	.12 @	
Ochre, domestic	lb.	.01¾ @	.02½
French	lb.	.03 @	
Oxide, pure	lb.	.09 @	
Yellow toner	lb.	2.50 @	
Zinc, C. P., imported	lb.	.21 @	
Deodorant			
Rodo	lb.	@	
Factice—See Rubber Substitutes			
Fillers, Inert			
Asbestine	ton	13.40 @	13.50
Baryta white (f.o.b. St. Louis, bbls.)	ton	23.00 @	
(f.o.b. St. Louis, 80 lb. paper bags)	ton	22.20 @	
Barytes, white, spot	ton	32.00 @	33.00
off color, spot	ton	24.00 @	25.00
Foam "A" (f.o.b. St. Louis)	ton	23.00 @	
Basofor	lb.	@	

New York Quotations

July 27, 1931

Prices Not Reported Will Be Supplied on Application

Blanc fixe, dry	lb.	$0.04½	@
pulp	ton	42.50	@45.00
C-C-O white (f.o.b. St. Louis, bbls.)	ton	15.00	@
Infusorial earth	ton	35.00	@
Slate flour, gray (fac'y)	ton	6.00	@
Suprex white, extra light	ton	70.00	@80.00
Whiting			
Chalk, imported	100 lbs.	.90	@ 1.50
Domestic	100 lbs.	1.00	@
Paris white, English cliffstone	100 lbs.	1.50	@ 3.50
Quaker	ton		@
Sussex	ton		@
Witco (l. c. l.) (f.o.b. New York)	ton	20.00	@
Wood flour	ton	25.00	@

Fillers for Pliability

Flex	lb.		@
Fumonex	lb.	.03	@ .07
P-33	lb.		@
Thermax	lb.		@
Velvetex	lb.	.02½	@ .06

Finishes

Mica, amber	lb.	.04½	@
Shellac, fine orange	lb.	.60	@
Starch, corn, pwd.	100 lbs.	2.57	@ 2.77
potato	lb.	.06	@
Talc, domestic	lb.	.01¼	@
dusting	lb.	.01½	@ .02
French	ton	18.00	@22.00
Italian	lb.	.02¼	@ .03
Pyrax A	ton		@

Inflating Material

Ammonium carb., pwd.	lb.	.10½	@
lump	lb.	.10	@
Sponge paste	lb.	.30	@

Mineral Rubber

Fluxrite (solid)	lb.		@
Genasco (fact'y)	ton	40.00	@42.00
Gilsonite (fact'y)	ton	37.14	@39.65
Granulated M. R.	ton		@
Hydrocarbon, hard	ton		@
Ohmlac Kapak. M. R. (f.o.b. fact'y)	ton	60.00	@
M. 4 (f.o.b. fact'y)	ton	175 00	@
Paradura (fact'y)	ton	60.00	@65.00
Parmr Grade 1	ton	23.00	@28.00
Grade 2	ton	23.00	@28.00
Pioneer, M. R., solid (fact'y)	ton	40.00	@42.00
M. R. granulated	ton	50.00	@52.00
Robertson, M. R., solid (fact'y)	ton	32.00	@80.00
M. R. granulated	ton	32.00	@80.00

Mold Lubricants

Rusco mold paste	lb.	.12	@ .30
Sericite	lb.		@
Soapbark (cut)	lb.	.07½	@ .08
Soapstone	lb.	.01	@ .01¼

Oils

Castor, blown, drums	lb.	.13¾	@ .14
Kerosene	gal.	.10	@
Mineral	gal.	.20	@
Poppy seed oil	gal.	1.70	@
Rapeseed, blown	gal.	.70	@ .72
Red oil, distilled	lb.	.07⅞	@ .08⅜
Rubber process	gal.	.25	@
Spindle	gal.	.30	@

Protective Colloids

Bentonite (dispersion clay)	lb.	$0.03	@
Casein, domestic	lb.	.06	@ .07½

Reenforcers

Aluminum flake (sacks, c. l.)	ton	21.85	@
(sacks, l.c.l.)	ton	24.50	@
Carbon Black			
Aerfloted arrow	lb.	.03½	@ .07
Cabot's certified black	lb.	.03	@
Century (works, La., c. l.)	100 lbs.	3.10	@
Disperso (works, La., c. l.)	100 lbs.	3.10	@
Elastex	lb.	.02½	@ .06
Excello	lb.	.03	@
Gastex (f. o. b. fact'y)			
contracts	lb.	.02½	@
carload	lb.	.02½	@
less carload	lb.	.03¾	@ .04¼
Micronex	lb.	.03½	@ .08
Ordinary (compressed or uncompressed)	lb.	.03	@ .07
Palmer gas black	lb.	.03	@
Supreme	lb.	.03	@
Clays			
Bento	lb.	.03	@
Blue Ridge, dark	ton		@
China	lb.	.01¼	@
Dixie	ton		@
Dusto	lb.	.08	@ .10
Langford	ton		@
Lexo (works)	ton	8.00	@
Par	ton		@
Perfection	ton	20.00	@
Suprex No. 1	ton	8.00	@
No. 2, dark	ton	6.50	@
Glue, high grade	lb.	.20	@ .25

Rubber Substitutes or Factice

Amberex	lb.	.15	@
Black	lb.	.07	@ .11
Brown	lb.	.07	@ .12
Thiokol	lb.	.30	@
White	lb.	.08	@ .15

Softeners

Burgundy pitch	100 lbs.	6.00	@
Atlas	100 lbs.	6.50	@
Corn oil, crude	lb.	.07⅞	@ .08
Cottonseed oil (P. S. Y.)	lb.		@
Cycline oil	lb.	.25	@ .34
Degras	lb.	.03½	@ .04½
Fluxol	ton	18.00	@80.00
Fluxrite (fluid)	lb.		@
Palm oil (Lagos)	lb.	.05	@
(Niger)	lb.	.04	@
(Witco)	lb.	.07½	@
Para-flux	gal.	.15	@
Petrolatum, snow white	lb.	.07	@ .07¾
Pigmentar	gal.	.18	@ .23
Pigmentaroil (tank cars, factory)	gal.	.18	@
(bbls., drums)	gal.	.23	@
Pine oil, destr. dist.	gal.	.54	@ .55
Pine pitch	bbl.	6.50	@ 7.00
Pine tar (retort)	gal.	.23	@ .25
Rosin K (280 lbs.)	bbl.	6.15	@
Rosin oil, compounded	gal.	.35	@
No. 3, deodorized	gal.	.57	@
No. 556, deodorized	gal.	.48	@
Rubberseed, drums	lb.	.09	@ .09½
Rubtack	lb.	$0.10	@
Tackol	lb.	.09	@ .18
Tonox	lb.		@
Witco No. 20	gal.	.08	@
Woburn oil	lb.	.05½	@
Wobonite No. 94	lb.	.03½	@

Solvents

Benzol (90% drums)	gal.	.24	@
Carbon bisulphide (drums)	lb.	.05½	@ .12
tetrachloride (drums)	lb.	.09	@ .09½
Dip-Sol	gal.		@
Dryolene, No. 9	gal.		@
Gasoline			
No. 303			
Drums, (c. l.)	gal.	.20	@
Tank cars	gal.	.16	@
Petrobenzol	gal.		@
Rub-Sol	gal.		@
Solvent naphtha (tanks)	gal.	.25	@
Stod-Sol	gal.		@
Troluoil	gal.		@
Turpentine, Venice	lb.	.20	@
dest distilled	gal.	.40	@ .44

Stabilizers

Laurex, ton lots	lb.		@
Sta-Tex A	lb.		@
Stearates			
Aluminum	lb.	.26	@ .27
Calcium	lb.	.26	@ .27
Magnesium	lb.	.28	@ .29
Zinc	lb.	.27	@ .28
Stearex B	lb.	.09	@ .13
Stearex flake	lb.	.09	@ .13
Stearic acid, dbl. pres'd.	lb.	.08½	@ .09

Vulcanizing Ingredients

Sulphur			
Rubber sulphur	100 lbs.	1.75	@ 2.50
99½% superfine (c.l.)	100 lbs.	2.20	@ 2.55
(l.c.l.)	100 lbs.	2.60	@ 3.10
Soft rubber, 100% (c.l.)	100 lbs.	2.60	@ 2.95
(l.c.l.)	100 lbs.	2.95	@ 3.50
Sulphur chloride	lb.	.03½	@ .04
Superfine commercial flour (bbls.)	100 lbs.	2.55	@ 3.10
(bags)	100 lbs.	2.20	@ 2.80
Tire brand, superfine	100 lbs.	1.75	@
Tube brand, velvet	100 lbs.	2.30	@
Velvet flour (240 lb. bbls.)	100 lbs.	2.95	@ 3.50
(150 lb. bags)	100 lbs.	2.60	@ 3.15
Telloy	lb.		@
Vandex	lb.		@
(See also Colors—Antimony)			

Waxes

Beeswax, white, com	lb.	.55	@
carnauba	lb.	.33	@
ceresin, white	lb.	.12½	@
montan	lb.	.06½	@
ozokerite, black	lb.	.28	@
green	lb.	.28	@
Paraffin			
122/124 crude, white scale	lb.	.03¼	@
124/126 crude, white scale	lb.	.03¼	@
125/127 fully refined	lb.	.04¼	@

Tire Production Statistics

	Pneumatic Casings—All Types			Solid and Cushion Tires		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1928	10,217,708	58,457,873	55,721,937	152,120	508,223	512,602
1929	9,470,368	54,980,672	55,515,884	122,200	407,347	436,027
1930	7,202,750	40,772,378	42,913,108	75,871	204,340	250,635
1931						
January	7,165,846	2,939,702	2,995,479	75,205	12,631	13,072
February	7,628,520	3,188,274	2,721,347	73,338	11,358	12,915
March	8,011,592	3,730,061	3,297,225	68,584	11,424	16,152
April	8,025,135	3,955,491	3,945,525	64,369	11,610	15,445
May	8,249,856	4,543,003	4,332,137	61,272	11,369	15,566

	Inner Tubes—All Types		
	Inventory	Production	Total Shipments
1928	12,087,464	60,131,381	57,845,189
1929	10,245,365	55,062,886	56,473,303
1930	7,999,477	41,936,029	43,952,139
1931			
January	7,551,503	2,898,405	3,249,734
February	7,936,773	3,132,770	2,720,135
March	8,379,974	3,559,644	3,031,279
April	8,330,155	3,693,222	3,708,949
May	8,438,799	4,329,731	4,224,594

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires		Consumption of Motor Gasoline (100%) Gallons
	Cotton Fabric Pounds	Crude Rubber Pounds	
1928	222,243,398	600,423,401	13,633,452,000
1929	208,824,653	598,994,708	14,748,552,000
1930	158,812,462	476,755,707	16,200,894,000
1931			
January	12,738,467	36,318,980	1,127,532,000
February	12,002,161	36,651,119	1,097,208,000
March	14,040,803	41,850,638	1,303,302,000
April	15,243,625	45,016,344	1,402,800,000
May	18,009,764	53,417,709	1,499,904,000

Rubber Manufacturers Association figures representing 80 per cent of the industry since January, 1929, with the exception of gasoline consumption.

Cotton and Fabrics

THE confidence inspired by President Hoover's first proposal for a year's suspension of all war debts was not sustained in later developments. It was apparent that Germany required more immediate aid than a debt moratorium. The realization that Germany was on the brink of financial collapse caused much consternation in almost every country.

Statesmen were urged to alleviate the crisis. The result was the seven-power parley in London where another proposal was made for the extension of short-term credits, with the possibility that they might be turned into long-term credits on the approval of an international committee. Through these two proposals and drastic action within the country, Germany is expected to pull through.

These events have influenced all markets. But now that there is a lull, the cotton market is again turning its attention to conditions within the industry; and the picture is not too bright.

Weather has been favorable although excessive rains in some sections have led to the belief that weevil damage will be serious. Exports are holding up and compare favorably with last year, but takings by spinners are still falling behind last year's totals. Consumption is still low, and stocks on hand high.

The business outlook is uncertain, and any predictions made at this time may be entirely upset by the weather man.

Week ended July 4. The market fluctuated back and forth during the week, but the sharp gain registered on Friday brought prices up to approximately the same level at which they closed on the previous week.

The debt parley continued to influence the market. The strong gain of 31 to 34 points on Friday was in response to news that France and the United States would shortly come to an agreement on reparations.

Trade buying dropped off somewhat in advance of the holiday, and the let-up sent the market off several times; but shorts were nervous and covered quickly.

Next Wednesday the Government will issue its first figures on acreage, and doubt is considerable as to what this report will reveal. Private estimates put the reduction at from 10 to 11 per cent. The crop is said to be about 70 per cent of normal up to the present time, with rain needed in large areas.

Exports for the first five months of this year exceeded those for the first five months of 1930, making cotton one of the few commodities that have shown improvement over last year. The export total was 2,298,929 bales, compared with 2,166,946 bales last year. Because of the lower price of cotton, however, the value of the exports was considerably less. Exports up to May 31 were valued at $133,446,535; while in the first five months of 1930 the value was $202,912,384. May exports were 335,796 bales, value, $18,824,828, against 208,695 in May, 1930, value $18,737,764.

Improvement in cotton cloths was reported by the New York Cotton Exchange Service: "Printcloth and broadcloth mills have improved their positions greatly, but the gains in other divisions are not sufficient yet to call for any change in curtailment plans. There is a feeling, however, that buyers of finished goods and garments may decide at any time to take advantage of current low prices in a large way if the business trend continues to point upward."

COTTON BEAR POINTS

1. A decrease of only 10 per cent in acreage was indicated by the last government report.
2. Forwardings to mills of world for the present season totaled 10,776,000 bales, compared with 12,622,000 last year and 14,956,000 in 1929.
3. World's visible supply of cotton is 5,370,000 bales, compared with 3,222,000 last year, and 2,119,000 in 1929.
4. Cotton cloth production has declined sharply.
5. No basis has been set for marketing the present crop.
6. The Farm Board's holdings of cotton are depressing the market.
7. Weather conditions thus far have been favorable to the crop.
8. Cotton spindles active during June numbered 25,798,910, against 26,397,906 in May and 27,659,308 in June last year.

COTTON BULL POINT

1. Exports this year are ahead of last year's.
2. Foreign mills are active.
3. Manufacturers are holding down inventories to meet demand.
4. Cotton consumed during June was above the total last year and slightly below May of this year.
5. Weevil emergence is reputed to be on the increase.
6. The small fertilizer sales may lead to a smaller output than is now expected.

Prices at the close of July 4 were:

Position	High	Low	Close	Previous Close
July	10.17	9.95	10.17	9.83
Oct.	10.53	10.34	10.51	10.19/20
Dec.	10.75	10.58	10.73/75	10.42/43
Jan.	10.86	10.69	10.86	10.54
Mar.	11.05	10.88	11.03/05	10.71
May	11.25	11.09	11.23/24	10.90

Week ended July 11. The government crop report on Wednesday was the most important, though not favorable market influence during the week. Losses of 37 to 44 points followed the release of the government estimate of cotton acreage under cultivation on July 1 at 41,491,000 acres, a reduction of only 10 per cent from the acreage on July 1, 1930. A cut of from 15 to 20 per cent had been hoped for.

Acreage reductions by states were: North Carolina, 18 per cent; Oklahoma, 17 per cent; Georgia 12 per cent; South Carolina, 11 per cent; Alabama, 10 per cent; Texas and Arkansas, 8 per cent; Mississippi, 6 per cent.

Another factor which added to the decline was the fine weather in the cotton belt, with rains where needed, and damage from insects is said to be small.

Domestic consumption for June was estimated by the New York Cotton Exchange Service at 450,000 bales, against 466,000 bales for May, and 405,000 for June of last year.

The market also reacted on the debt news. Doubt, earlier in the week, as to acceptance by the French of the proposal as Mr. Hoover offered it, led to liquidation. The decline in the stock market did not have a very salutary effect either.

There was a bright spot in the market on Friday when trade and commission house buying was renewed with some strength, sending the market up from 2 to 8 points for the day. The market was easier, however, on Saturday's opening.

Foreign conditions were reported by the New York Cotton Exchange Service to be improved in the last month. China was said to have made heavy purchases of American cotton, and new business was booked at a profit. Cloth inquiry is good at Lancashire, but the political situation is in doubt. France, Germany, and Italy also reported favorably.

Prices at the close of July 11 were:

Position	High	Low	Close	Previous Close
July	9.15	9.05	9.09	9.19
Oct.	9.53	9.39	9.45/46	9.53/55
Dec.	9.76	9.62	9.67/68	9.77/80
Jan.	9.86	9.72	9.77	9.88/90
Mar.	10.05	9.93	9.98	10.08/09
May	10.22	10.09	10.16	10.24

Week ended July 18. Foreign news was the most important market factor during the week. Germany's desperate financial condition, and suspension of activities on the stock exchange in that country on Monday and Tuesday caused some apprehension for a time.

Later, however, when it was seen that Germany was doing all in her power to restrict the gold flow out of the country, and that a settlement might be reached between France and Germany, the market assumed a better tone.

The net change for the week was almost negligible although fluctuations were wide at times. A strong advance was registered on Thursday in response to weather news. Heavy rain has been falling in sections which have already had plenty of moisture, and it is feared that the excessive precipitation will lead to weevil propagation.

Cotton cloth figures showed a sharp drop in output for the week. The *Times* index stood at 65.7, compared with 89.4 for the week ended July 4 and with 71.6 for the week ended July 12, 1930. The decline from 89.4 to 65.7 was due to seasonal factors and to the sharp curtailment by mills. Manufacturers evidently are not to be persuaded from cutting their output even though prices are firmer.

Cotton consumed during June was announced by the Census Bureau to have been 455,388 bales of lint and 61,433 of linters, compared with 465,770 and 66,949 in May, and 405,236 and 59,196 in June last year.

Exports in June totaled 255,459 bales of lint, compared with 335,796 in May, and 185,053 in June last year. To date, exports this season are about 81,000 bales greater than last year.

Cotton spindles active during June numbered 25,798,910, compared with 26,397,906 in May, and 27,659,308 in June last year.

Forwardings to mills of the world so far this season were 10,776,000 bales, compared with 12,622,000 last year, and 14,956,000 in 1929.

Prices at the close of July 18 were as follows:

Position	High	Low	Close	Previous Close
July	9.17	9.12	9.12	9.13
Oct.	9.47	9.31	9.45/47	9.41/43
Dec.	9.69	9.56	9.69	9.66/67
Jan.	9.82	9.69	9.80/82	9.79
Mar.	10.01	9.87	10.01	9.99/10
May	10.18	10.02	10.17/18	10.16/18

Week ended July 25. Reports of weevil emergence because of heavy rains in the cotton belt served to steady the market on two occasions, but clearing weather, making for good progress of the crop, wiped out these advances. The net change for the week was downward prices off more than 40 points.

Foreign affairs, of course, had considerable effect on market action. The second of President Hoover's proposals was adopted by a seven-power parley of ministers for the relief of Germany. The relief consisted in extending short-term credits, and disappointment was expressed in many quarters because the relief was not of a more permanent character.

Uncertainty over the situation has had an adverse influence on all markets. An immediate collapse has been avoided, tremendous effort will be required on the part of the German people to work themselves out of their difficulties. The most encouraging result of the conference was that France and Germany seem to be reaching the accord that is so necessary for the welfare of both nations.

In our country another conference is causing doubt. The American Cotton Cooperative Association convened in New Orleans for the purpose of discussing the disposition of the present crop. No definite news has been forthcoming; and until farmers know how much money they can borrow on the crop now maturing, the market will be unsettled.

The Cotton Exchange Service estimates that exports will be over 800,000 bales in excess of the needs of foreign spinners and that foreign stocks have accumulated to over 2,650,000 bales, compared with only 1,865,000 bales accumulated last year.

Prices at the close of July 25 were:

Position	High	Low	Close	Previous Close
Oct.	9.11	9.01	9.02/03	9.08/10
Dec.	9.34	9.22	9.24/25	9.30/32
Jan.	9.44	9.32	9.36	9.41/42
Mar.	9.63	9.52	9.52/53	9.62
May	9.80	9.70	9.70	9.77/78

July 27 cotton fell off $1 a bale before a late rally although the list closed from 6 to 11 points lower than on July 25. A big carryover is anticipated. Traders are preparing for the first government crop estimate of the season.

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. The market for the time being seems to lack character. In spite of the unevenness of demand and the irregularity of prices the market is gradually working into a firmer position on fabrics which are substantially lower than parity with raw material. Orders for general replenishment of stock on the part of consumers will tend to strengthen fabric prices.

RAINCOAT FABRICS. The raincoat business is still very quiet, and a few staple numbers are the only coats selling in any quantity. The active inquiry for goods by the trade in July indicates that soon after August 1 raincoats will be selling in fair volume.

SHEETINGS. Since the latter part of June the demand for sheetings has been very active, and prices have eased considerably. Even now they are the lowest of the year. Dealers are expecting a quiet market in sheetings for the next few weeks.

TIRE FABRICS. During July the market for tire fabrics held quiet and unchanged. Down to 27 cents, basis, was possible about the middle of the month on orders for quantity in American carded peeler cord fabric f. o. b. mills.

WEEKLY AVERAGE PRICES OF MIDDLING COTTON

Week Ended	Cents per Pound
June 27	9.98
July 4	10.10
July 11	9.60
July 18	9.19
July 25	9.24

Estimating Rubber Consumption

In estimating future consumption of rubber in the United States for any year, a method frequently followed is to first estimate the number of automobile casings that will be produced and multiply this factor by a figure representing the total weight of crude rubber used for all purposes, per automobile casing produced. The determination of the latter figure within a reasonable degree of accuracy is possible.

In the two columns below are given figures representing rubber consumption for all purposes, per casing produced, A based on official Census Bureau statistics and adjusted Rubber Association statistics of casings production, and government figures of crude rubber consumption, and B based on Rubber Association reports of total crude rubber consumption and casings production, unadjusted. Figures in pounds.

	A	B	B—A
1925	14.77	17.53	2.76
1926	13.64	15.96	2.32
1927	13.27	15.46	2.19
1928	13.10	15.23	2.13
1929	15.14	17.23	2.09
1930	15.95	18.47	2.52

The figures under A are as nearly official as can be given; those under B show a reasonably close agreement in trend with A. The difference between figures in the two columns ranges from 2.76 pounds in 1925 to 2.09 pounds in 1929, B always being greater than A. About 75 per cent of the change shown from one year to the next by the Rubber Association statistics B, usually appears when final official figures A become available, 1929 being an exception to this rule.

For the twelve months ended April, 1931, the association statistics give a figure of 17.97 pounds under B, which seems to foreshadow a lower crude rubber consumption for all purposes, per casing produced, for 1931 than for 1930. This is somewhat contrary to what one would expect in view of the continued gradual decline which is occurring in the use of reclaimed rubber.

The logical conclusion would seem to be that consumption of rubber in the tire section of the industry is being maintained better than in the other sections of the industry—footwear, mechanical goods, etc., and first quarter association statistics in fact show that while consumption of rubber in tires was 88.7 per cent as great as in 1930, consumption in other products was only 85.6 per cent of the 1930 first quarter. Rubber Division, Department of Commerce, Washington, D. C.

New York Quotations

July 27, 1931

CHAFER

14 oz. 60" 20/8 ply Karded peeler	lb.	.27@
14 oz. 60" 10/4 ply Karded peeler	lb.	.23@
9¼ oz. 60" 20/4 ply Karded peeler	lb.	.29@
9¼ oz. 60" 10/2 ply Karded peeler	lb.	.25@

BUILDER

17¼ oz. 60" 23/11 ply Karded peeler	lb.	.27@
17¼ oz. 60" 10/5 ply Karded peeler	lb.	.25@

LENO BREAKER

8¼ oz. and 10¼ oz. 60" Karded peeler	lb.	.27@

CORD FABRICS

23/5/3 Karded peeler, 1 1/16" cotton	lb.	.27@
23/4/3 Karded peeler, 1 1/16" cotton	lb.	.29@
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.25@
13/3/3 Karded peeler, 1 1/16" cotton	lb.	.24@
7/2/2 Karded peeler, 1 1/16" cotton	lb.	.23@
23/5/3 Karded peeler, 1¼" cotton	lb.	.32@
23/5/3 Karded Egyptian, Egyptian uppers cotton	lb.	.39@
23/5/3 Combed Egyptian	lb.	.45@

Drills

38-inch	2.00-yard	yd.	$0.11 @
40-inch	3.47-yard		.06 @
50-inch	1.52-yard		.14 @
52-inch	1.90-yard		.11½ @
52-inch	2.20-yard		.10 @
52-inch	1.85-yard		.11⅞ @

Ducks

38-inch	2.00-yd. D. F.	yd.	.11 @
40-inch	1.45-yard S. F.		.15⅛ @
72-inch	1.05-yard D. F.		.21½ @
72-inch	16.66-ounce		24¾ @
72-inch	17.21-ounce		.25 @

MECHANICAL

Hose and belting	lb.	.21½ @

TENNIS

52-inch	1.35-yard	yd.	.16 @

Hollands

RED SEAL

36-inch	yd.	.12½ @
40-inch		.13 @
50-inch		.19 @

GOLD SEAL

40-inch, No. 72	yd.	.16 @

Osnaburgs

40-inch	2.35-yard	yd.	$0.09¼ @
40-inch	2.48-yard		.08⅞ @
40-inch	3.00-yard		.07⅜ @
40-inch	10-oz. part waste		.10⅜ @
40-inch	7-oz. part waste		.07 @
37-inch	2.42-yard		.09 @

Raincoat Fabrics

COTTON

Bombazine 64 x 60	yd.	.09 @
Bombazine 60 x 48		.08 @
Plaids 60 x 48		.10¾ @
Plaids 48 x 48		.09¾ @
Surface prints 64 x 60		.12 @
Surface prints 60 x 48		.11 @
Print cloth, 38½-in., 60 x 48		.05 @
Print cloth, 38½-in., 64 x 60		.04½ @

Sheetings, 40-inch

48 x 48,	2.50-yard	yd.	.06⅝ @
48 x 48,	2.85-yard		.06 @
64 x 68,	3.15-yard		.07 @
56 x 60,	3.60-yard		.06 @
44 x 48,	3.75-yard		.05 @
44 x 40,	4.25-yard		.04⅜ @

Sheetings, 36-inch

48 x 48,	5.00-yard	yd.	.04¼ @
44 x 40,	6.15-yard		.03½ @

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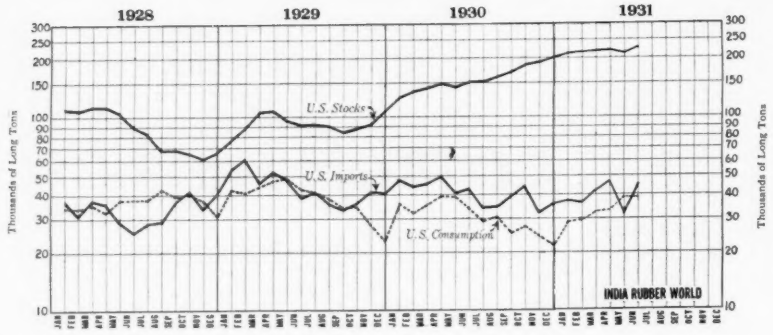
Imports, Consumption, and Stocks



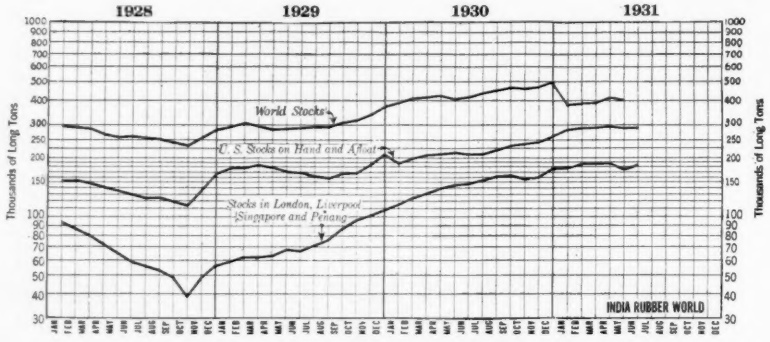
United States Stocks, Imports, and Consumption

JUNE consumption of crude rubber by manufacturers in the United States is estimated at 37,916 long tons, showing practically no change as compared with May which is counter to the usual seasonal decrease of 5 per cent experienced in previous years. Consumption for June, 1931, is 10.9 per cent over June a year ago and the highest for any month since May, 1930.

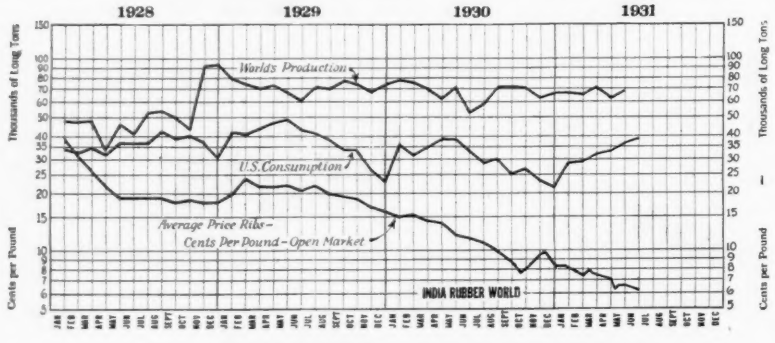
Imports of crude rubber for June amounted to 45,776 long tons, an increase of 44.3 per cent over the May figure of 31,720 long tons, and 7.3 per cent over June, 1930. Estimates show total domestic stocks of crude rubber on hand June 30 at 225,536 long tons, an increase of 2.1 per cent over May, and 48.8 per cent over June 30, 1930. Crude rubber afloat for the United States ports on June 30 is estimated at 69,421 long tons as against 73,560 long tons on May 31 and 58,658 long tons on June 30, 1930.

Trade Commissioner Don C. Bliss, Singapore, has devised a new method of estimating fluctuations in monthly native rubber production in the Straits Settlements. The total Malayan production of estates over 100 acres is regularly reported, and the monthly exports (approximate production) of natives in each region except Straits Settlement can be calculated from the statistics of estate production, estates and dealers stocks, and exports.

The total 1929 Straits Settlements native production has been estimated by Bliss at 21,276 tons, and the total for 1930 at 21,060 tons. The new method consists merely of assuming fluctuations in Straits native production or exports on the same basis as fluctuations in up-country Malayan native output shown by the calculated figures. This method, while arbitrary, is believed preferable to the method of estimating Straits native output at the flat rate of 2,000 tons monthly, which is the method now followed by Malayan officials.



World, United States, London, Liverpool, Singapore and Penang Stocks



World's Production, U. S. Consumption, and Price of Ribs

Week Ended	Stocks—Tons London	Liverpool
June 27	82,441	54,086
July 4	82,170	54,522
July 11	82,079	54,444
July 18	81,766	54,697
July 25	81,104	54,335

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Net Imports* Tons	U. S. Consumption Tons	U. S. Stocks on Hand† Tons	U. S. Stocks Afloat† Tons	United Kingdom Stocks†‡ Tons	Singapore and Penang Stocks, Etc.†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks—U. S. A., U. K., Singapore, and Penang†‡ Tons
1925	384,837	384,644	50,985	52,421	6,328	18,840	527,600	553,300	180,850
1926	411,962	358,415	72,510	51,238	51,320	26,443	621,900	542,000	273,060
1927	431,807	372,528	100,130	47,938	66,261	25,798	607,300	593,866	298,780
1928	446,421	442,227	66,166	68,764	22,603	32,905	653,837	686,945	284,198
1929	561,454	466,475	105,138	62,389	73,253	35,548	860,404	804,820	371,425
1930	488,343	375,980	200,998	56,035	120,575	46,003	815,835	702,935	492,165
1931									
January	37,098	28,557	209,487	56,188	124,336	48,306	65,714	49,620	382,129
February	36,645	28,797	212,834	63,680	126,874	48,164	65,719	59,970	387,872
March	40,338	32,788	218,317	63,133	133,013	48,300	71,218	59,980	399,630
April	46,648	33,321	228,383	56,700	138,144	44,857	63,395	51,200	411,384
May	31,720	37,817	220,799	73,564	138,945	43,212	68,628	63,190	402,936
June	45,776	37,916	225,536	69,421	.....	.....	.....	.....	.....

*Including liquid latex, but not guayule.
†Stocks on hand the last of the month or year.
‡W. H. Rickinson & Son's 1931 figures.

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Rubber Scrap

THE rubber scrap market is rather more than seasonally dull at present. Of the grades listed, 9 are quoted a little below prices of a month ago. The remainder of the list is unchanged. Collections are moderate because of the light consuming demand and the localizing effect of freight rates on the movement of scrap.

Southwestern Freight Bureau Docket No. A-587 proposes to establish Column 15 rates on old rubber, subject to Note 2, page 443, of Western Classification, minimum weight 50,000 pounds, between all points covered by S.W.L. Tariffs 151, 152, 154-A, also Texas Lines Tariff No. 60, and related tariffs, permitting stop-in-transit to complete loading, and Column 12½ rates minimum weight 75,000 pounds without stop-in-transit, allowing both as exceptions to Rule 34 of Classification.

BOOTS AND SHOES. Demand seems better, but the supply is limited by the low prices. This limitation is caused in part, also, by the extra cost of labor involved in handling the many small pieces required to make a ton of scrap.

INNER TUBES. Handling costs, freight, and the small quantities procurable are factors that combine to reduce collections. Low prices serve to induce dealers to stock tonnages of inner tubes for an advance in price in the future as the capital involved in large inventories is not excessive.

TIRES. The demand is good, but collections are not heavy. Business in scrap tires is distinctly localized because of irrational freight rates. Stocks held in the important centers are released for near-by reclaiming at $3.50 to $4 per ton, but even at that level freight rates interfer with handling scrap tires profitably.

MECHANICALS. All grades in this group are dull. Quotations are unchanged except in the case of airbrake hose which is currently $8 to $9 down $2 to $2.50 per ton from last quotation.

HARD RUBBER. Stocks are moderate. The price is at last month's level.

CONSUMERS' BUYING PRICES

Carload Lots

Delivered Eastern Mills

July 27, 1931

	Prices
Boots and Shoes	
Boots and shoes, black..100 *lb.*	$0.875 @$1.00
Colored .....100 *lb.*	.625 @ .75
Untrimmed arctics...100 *lb.*	.625 @ .75
Tennis shoes and soles..100 *lb.*	.50 @ .60
Inner Tubes	
No. 1, floating .....*lb.*	.03¾ @ .04
No. 2, compound.....*lb.*	.01¾ @ .02
Red .....*lb.*	.01½ @ .01⅝
Mixed tubes .....*lb.*	.01½ @ .01¾
Tires	
Pneumatic Standard	
Mixed auto tires with beads .....*ton*	9.50 @10.00
Beadless .....*ton*	13.00 @13.50
Auto tire carcass.....*ton*	12.00 @12.50
Black auto peelings....*ton*	20.00 @21.00
Solid	
Clean mixed truck....*ton*	24.00 @25.00
Light gravity .....*ton*	31.00 @32.00
Mechanicals	
Mixed black scrap .....*lb.*	.00⅝ @ .00¾
Hose, air brake.....*ton*	8.00 @ 9.00
Garden, rubber covered..*lb.*	.00¾ @ .00½
Steam and water, soft..*lb.*	.00¾ @ .00½
No. 1 red .....*lb.*	.01½ @ .01⅝
No. 2 red .....*lb.*	.01 @ .01⅛
White druggists' sundries *lb.*	.01⅛ @ .01¾
Mechanical .....*lb.*	.01 @ .01⅛
Hard Rubber	
No. 1 hard rubber .....*lb.*	.08¼ @ .09

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

Number	Commodity	City and Country
‡52,201	Shoes, overshoes, and toys	Hamburg, Germany
*52,202	Vacuum cups	Montreal, Canada
†52,203	Hard rubber combs	San Juan, Porto Rico
†52,224	Tape	Caracas, Venezuela
†52,225	Tires	Edmonton, Canada
†52,245	Druggists' sundries	Fortaleza, Brazil
†52,286	Bathing caps, shoes, etc.	Mexico City, Mexico
†52,308	Fire hose	Oslo, Norway
‡52,347	Bathing caps, water bottles, ice bags, tubing, syringes, bath mats, and toys	Montreal, Canada
*52,348	Bearings	Toronto, Canada
*52,356	Sport goods	Pretoria, South Africa
†52,414	Hose	Bombay, India
†52,434	Belting	Copenhagen, Denmark
†52,435	Surgical goods	Bombay, India
†52,436	Surgical goods	Bombay, India
†52,437	Overshoes	Milan, Italy
†52,438	Tires	Palermo, Italy
†52,439	Tile	Manila, Philippine Islands
*†52,440	Airplane tires	Belgrade, Yugoslavia
*†52,449	Sheeting	Arnhem, Netherlands
*†52,462	Automobile deck material	Belgrade, Yugoslavia
†52,467	Waist belts	Bridgetown, Barbados
†52,499	Thread and other rubber goods	Barcelona, Spain
*†52,570	Boots, overshoes, bathing slippers, and soles	Lyon, France
†52,573	Office accessories	Vienna, Austria
*52,574	Sport and athletic goods	La Paz, Bolivia
†52,577	Bathing caps, balloons, toys, shoes, and sport goods	Paris, France

*Purchase. †Agency. *†Purchase and agency. ‡ Either.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Dunlop Tire & Rubber Goods, Ltd.	Pfd.	$1.75 q.	July 2	.....
Faultless Rubber Co.	Com.	$0.62½ q.	Oct. 1	Sept. 15
General Tire & Rubber Co.	Com.	$0.62½ q.	Aug. 1	July 25
Plymouth Rubber Co.	Pfd.	$1.75 q.	July 15	.....

Rims Approved by The Tire & Rim Association, Inc.

Rim Size	Six Months, 1930 Number	Six Months, 1930 Per Cent	Six Months, 1931 Number	Six Months, 1931 Per Cent
Motorcycle				
24x3 Std.	132	0.0	285	0.0
Clincher				
30x3½	31,592	0.3	14,188	0.2
31x4	150	0.0	.....	...
17" Balloon				
17x3.25	.....	...	25,659	0.3
17x4	.....	...	82,902	1.0
17x4½	.....	...	140,035	1.7
17x5	.....	...	7,188	0.1
18" Balloon				
18x3.00	.....	...	316	0.0
18x3½	645	0.0	.....	...
18x4	748,620	6.8	191,330	2.3
18x3.25	25,185	0.2	118,711	1.4
18x4½	77,852	0.7	20,051	0.2
18x5	44,493	0.4	39,387	0.5
18x6	20	0.0	18,783	0.2
19" Balloon				
19x2.75	2,296,606	20.9	89,595	1.1
19x3.00	422,334	3.8	85,632	1.0
19x3½	165,410	1.5	3,060	0.0
19x4	1,216,451	11.1	389,003	4.7
19x3.25	21,926	0.2	2,244	0.0
19x4½	253,410	2.3	235,619	2.1
19x5	85,080	0.8	54,356	0.7
19x6	12	0.0	.....	...
20" Balloon				
20x2.75	10,291	0.1	33,697	0.4
20x3½	34,574	0.3	9,443	0.1
20x4	99,201	0.9	18,003	0.2
20x4½	101,701	0.9	9,432	0.1
20x5	8,484	0.1	14,248	0.2
20x6	631	0.0	335	0.0
21" Balloon				
21x3½	103,453	1.0	31,029	0.4
21x2.75	.....	...	1,023	0.0
21x4	19,258	0.2	7,251	0.1
21x4½	14,689	0.1	8,021	0.1
21x5	938	0.0	2,009	0.0
21x6	3,197	0.0	1,734	0.0
22" Balloon				
22x4	1,358	0.0	153	0.0
22x4½	173	0.0	.....	...
Drop Center				
17x3.00 D	.....	...	10	0.0
17x3.25 E	.....	...	7,283	0.1
17x3.62 F	.....	...	216	0.0
17x4.00 F	.....	...	6	0.0
18x2.15 B	13,920	0.1	16,447	0.2
18x3.25 E	.....	...	322,091	3.0
18x3.62 F	.....	...	24	0.0
18x4.00 F	.....	...	20	0.0
18x4.19 F	.....	...	11	0.0
Drop Center (*Continued*)				
19x2.15 B	23,845	0.2	5,461	0.1
19x2.75 D	36,698	0.3	3,880	0.0
19x3.00 D	3,131,898	28.5	4,479,450	54.0
19x3.25 E	.....	...	65,887	0.8
19x3.62 F	.....	...	1,603	0.0
19x4.00 F	.....	...	29,410	0.4
20x2.75 D	.....	...	423	0.0
20x4.00 F	10,079	0.1	.....	...
Semi Drop Base Split				
17x3.00 D	.....	...	28	0.0
17x3.25 E	.....	...	14,759	0.2
17x3.62 F	.....	...	2,519	0.0
18x3.00 D	.....	...	25	0.0
18x3.25 E	.....	...	26,241	0.3
19x3.00 D	59,174	0.5	117,624	1.4
19x3.62 F	.....	...	20	0.0
High Pressure				
30x3½	5,043	0.0	5,946	0.1
32x4	6,041	0.1	1,987	0.0
32x4½	6,004	0.1	2,616	0.0
34x4½	3,338	0.0	.....	...
18" Truck				
28x5	300	0.0	1,100	0.0
32x7	.....	...	6,352	0.1
34x8	.....	...	1,088	0.0
20" Truck				
30x5	1,400,924	12.7	1,196,349	14.5
32x6	213,633	1.9	114,930	1.4
34x7	146,950	1.3	76,917	0.9
36x8	76,989	0.7	42,132	0.5
9-10x20	7,265	0.1	5,848	0.1
40x10.50	851	0.0	1,231	0.0
42x11	376	0.0	805	0.0
22" Truck				
36x7	2,180	0.0	1,975	0.0
38x8	12,929	0.1	6,634	0.1
9-10x22	1,354	0.0	2,923	0.0
24" Truck				
34x5	1,422	0.0	1,025	0.0
36x6	6,846	0.1	1,841	0.0
38x7	11,690	0.1	8,480	0.1
40x8	32,457	0.3	26,389	0.3
9-10x24	2,853	0.0	5,824	0.1
44x10	383	0.0	.....	...
46x11	160	0.0	98	0.0
Airplane				
18x3	563	0.0	200	0.0
24x3	283	0.0	.....	...
24x4	514	0.0	109	0.0
32x6	209	0.0	.....	...
36x8	103	0.0	.....	...
44x10	25	0.0	114	0.0
Totals	11,005,165	...	8,261,073	...

CLASSIFIED ADVERTISEMENTS

SITUATIONS WANTED

MANAGER OF DEPARTMENT MANUFACTURING COMPRESSED asbestos sheet packing, asbestos high pressure packings, desires to make change. Ten years' experience. University graduate. Address Box No. 10,097, care of INDIA RUBBER WORLD.

CHEMIST, WITH WIDE EXPERIENCE IN CUSTOM WORK, rubber and mill room and by-product coke, wishes to locate in or near Pittsburgh or Cleveland. Single, age forty-two. Employed. Address Box No. 10,098, care of INDIA RUBBER WORLD.

RUBBER CHEMIST, UNIVERSITY GRADUATE, WITH EIGHTEEN years' practical experience in the rubber industry is looking for new permanent connection. Familiar with laboratory research, development and factory control work, with compounding problems and stock handling from milling to vulcanizing in the manufacture of tires, tubes, cables, mechanical soft and hard rubber, dipped goods, and specialties. Age forty-three, married. Best references. Address Box No. 11,002, care of INDIA RUBBER WORLD.

FOREMAN OF HOSE DEPARTMENT. EIGHTEEN YEARS' EXperience in braided, wrapped, and cotton rubber lined hose. Had charge of hose room in one of the largest companies in Akron. Have just built up a braided hose department from 400,000 feet to over a million feet per month. Familiar with different makes of lead presses. Employed but have satisfactory reason for desiring a change. Very best of references. Address Box No. 11,003, care of INDIA RUBBER WORLD.

ASSISTANT SUPERINTENDENT OR FOREMAN, EXPERIENCED in mechanical goods, calender. mill, and press room. Knows principles of compounding. Wants position with reliable and progressive company. Now employed. Address Box No. 11,006, care of INDIA RUBBER WORLD.

SUPERINTENDENT, TECHNICAL GRADUATE, FOURTEEN years' experience in the manufacturing of tires, tubes, heels, and composition soles. Complete knowledge of compounding, construction, and all factory details. Competent to organize and supervise factory or any department. References furnished. Address Box No. 11,007, care of INDIA RUBBER WORLD.

FACTORY SUPERINTENDENT OR DEPARTMENT SUPERINtendent available for immediate connection. Years of practical experience and thorough training gives him complete background. Especially valuable in rubberizing and calendering, mill room, curing, and compounding. Will accept moderate salary to start where good future is offered. Will go anywhere. Best of references. Address Box No. 11,008, care of INDIA RUBBER WORLD.

GRADUATE CHEMIST, SEVEN YEARS' EXPERIENCE IN MEchanical and automotive goods compounding, at present employed, desires position with company engaged in the manufacture of automotive rubber goods or with company contemplating entering this field. Address Box No. 11,009, care of INDIA RUBBER WORLD.

SITUATIONS WANTED

ASSISTANT TO EXECUTIVE, AGE TWENTY-SEVEN, TWO AND a half years' production and factory development with large rubber company, three years' production and practical research, brake linings, packings, etc., with large asbestos corporation. Excellent record. Address Box No. 11,010, care of INDIA RUBBER WORLD.

WANTED: POSITION AS FACTORY MANAGER OR SUPERintendent in rubber or artificial leather plant by American, forty-nine years of age, who has had wide experience in all branches and can furnish up-to-date formulas for all classes of coated cloths, auto topping, shoe stocks, raincoating, etc., as well as rubber bands, druggists' sundries. Can handle help with best results. Will consider position in United States or Canada. Can furnish highest references as to character and ability. Address Box No. 11,013, care of INDIA RUBBER WORLD.

POSITION WANTED AS SUPERVISOR OF RUBBER DEPARTment, thoroughly practical in the manufacture of the following: Auto top material, leatherette, calendered clothing, friction tape, splicing compound, double napped sheeting, hospital sheeting, rubberizing, rubber and leather for bag and novelty, backing cloth for shoe trade, all pure gum sheetings for baby pants, aprons, etc., cements for shoe and coat trade. Thoroughly understand all cures, compounds, varnishes, and machinery. Address Box No. 11,014, care of INDIA RUBBER WORLD.

POSITION WANTED AS MILL AND CALENDER ROOM FOREman with years of experience on tires, mechanicals, and sundries. First-class concerns considered. Address Box No. 11,015, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

WANTED: CHEMICAL ENGINEER FOR RUBBER INDUSTRY. Prefer man with experience in druggists' rubber sundries. Should possess aggressiveness and leadership. Give full particulars when replying. Address Box No. 11,004, care of INDIA RUBBER WORLD.

WANTED: ASSISTANT SUPERINTENDENT FOR THE RUBBER industry. Experience in mechanical and druggists' sundries preferable. Technical education desirable. In replying, give full particulars including references. Address Box No. 11,005, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

WE CAN FINANCE, DEVELOP, MANUFACTURE, AND MARKET, on a satisfactory basis, your ideas for rubber products. Address Box No. 10,099, care of INDIA RUBBER WORLD.

WILL RENT SMALL FACTORY WITH MACHINERY. MAchinery will be installed to suit tenant. Address Box No. 11,011, care of INDIA RUBBER WORLD.

Fort-Hill-Engraving-Co. Inc.
113 Pearl Street . . . . . Boston, Mass.
ESTABLISHED 1908
Producers of Dies for Embossing Rubber Soles—Outsole Medallions—Size and Width Stamps—Ankle Patch Dies—Stamping Dies for all kinds of rubber products.

I. T. GURMAN
CONSULTING CHEMICAL ENGINEER
Golf Ball Specialist
PLANT LAYOUT · OPERATION · EQUIPMENT · FORMULAS
INSTALLATION · COSTS · PROCESSES · ESTIMATES
64 FAULKNER STREET MALDEN, MASS.

The Franz Foundry & Machine Co.
AKRON, OHIO
MOLDS, CORES AND RUBBER MACHINERY
HEATER PRESSES, ENGRAVING MACHINES
WATCH CASE HEATERS, RETREAD EQUIPMENT

Rubber Molds — Tools — Dies — Special Machinery—and Mechanical Rubber Goods Molds
THE COLUMBIA RUBBER MOLD CO.
968 East 69th Place, Cleveland, O.

MOLDS for Mechanical Rubber Goods, Sponge Rubber, and other purposes. 9 years in business making molds.
HENRY MALM 279 MORRIS AVENUE NEW YORK, N. Y.

INTERNATIONAL PULP CO.
41 Park Row, NEW YORK, N. Y.
SOLE PRODUCERS
ASBESTINE
REG. U. S. PAT. OFF.

(*Advertisements continued on page* 120)

World Rubber Shipments—Net Exports

Long Tons

	Calendar Years		1931			
	1929	1930	Mar.	Apr.	May	June
British Malaya						
Gross Exports	579,524	547,043	48,589	43,353	44,281	39,505
Imports	161,612	133,876	12,009	9,977	10,479	12,115
Net	417,912	413,167	36,580	33,376	33,802	27,390
Ceylon	80,795	76,406	5,881	4,333	4,534	5,246
India and Burma	11,720	10,782	1,209	641	622	.....
Sarawak	11,079	10,310	930	788	869	1,138
British No. Borneo	7,381	7,052	542	*500	*500	*500
Siam	5,024	4,349	536	340	413	337
Java and Madura	66,010	69,755	5,434	6,473	7,372	.....
Sumatra E. Coast	87,589	79,396	7,104	6,063	6,799	.....
Other N. E. Indies	134,732	115,254	11,258	8,759	10,955	.....
French Indo-China	10,147	9,877	1,233	610	702	938
Amazon Valley	21,148	14,260	1,338	629	1,110	621
Other America	996	516	67	13	6	*35
Guayule	1,275	1,095	.....	.....	.....	.....
Africa	4,596	3,961	365	320	*300	*300
Totals	860,404	816,180	72,477	62,845	67,984	.....

*Estimate. *Compiled by Rubber Division, Department of Commerce, Washington, D. C.*

World Rubber Absorption—Net Imports

Long Tons

	Calendar Years		1931		
	1929	1930	Mar.	Apr.	May
CONSUMPTION					
United States	472,000	376,107	33,076	33,613	38,149
United Kingdom	72,023	74,760	5,425	4,409	5,679
NET IMPORTS					
Australia	15,886	5,354	435	457	884
Austria	3,324	2,365	148	293	299
Belgium	9,445	10,740	862	515	1,153
Canada	35,453	28,793	3,012	2,070	2,748
Czechoslovakia	4,650	4,532	507	324	711
Denmark	799	1,147	66	107	107
Finland	976	1,262	44	134	29
France	59,342	68,503	4,386	4,346	2,880
Germany	49,078	45,488	3,545	3,054	3,231
Italy	17,169	18,570	418	528	1,023
Japan	34,284	32,731	2,323	3,478	3,755
Netherlands	3,022	2,924	346	333	86
Norway	813	1,143	74	39	88
Russia	12,626	16,229	2,531	1,450	1,034
Spain	2,400	2,400	392	208	180
Sweden	3,857	4,414	216	215	271
Switzerland	653	808	77	80	60
Others estimated†	7,000	7,200	*600	*600	*600
Totals	804,800	705,470	58,483	56,253	62,967
Minus United States (Cons.)	472,000	376,107	33,076	33,613	38,149
Total foreign	332,800	329,363	25,407	22,640	24,818

*Estimate to complete table. †Includes Argentina, Brazil, Chile, China, Cuba, Egypt, Estonia, Hungary, Latvia, Mexico, Poland, Portugal, and Union of South Africa.
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for June, 1931:

Rubber Exports

Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham

June, 1931

To	Sheet and Crepe Rubber Tons	Latex Concentrated Latex and Revertex Tons
United Kingdom	4,968	26
United States	27,713	53
Continent of Europe	4,435	27
British possessions	342	2
Japan	1,727	...
Other countries	104	...
Totals	39,289	108

Rubber Imports

Actual Imports by Land and Sea

June, 1931

From	Dry Rubber Tons	Wet Rubber Tons
Sumatra	583	5,681
Dutch Borneo	413	3,024
Java and other Dutch Islands	128	23
Sarawak	1,075	63
British Borneo	189	22
Burma	143	18
Siam	242	95
French Indo-China	312	27
Other countries	68	9
Totals	3,153	8,962

Ceylon Rubber Exports

January 1 to April 30, 1931

To	Tons
United Kingdom	4,921.62
Continent	2,460.05
Other countries in Europe	36.80
Australia	589.14
America	15,639.69
Other countries in America	116.74
Egypt	5.93
Africa	2.29
India	11.75
Japan	132.04
Other countries in Asia	3.00
Total	23,919.05
For the same period last year	26,773.15

Annual Exports, 1923-1930

	Tons
For the year 1930	75,602.18
1929	80,219.25
1928	57,825.48
1927	55,355.77
1926	58,799.56
1925	45,697.19
1924	37,351.13
1923	37,111.88

Crude Rubber Imports by Customs Districts

Including latex, dry rubber content

	May, 1931		May, 1930	
	Pounds	Value	Pounds	Value
Massachusetts	2,948,448	$257,015	2,720,852	$422,429
New York	66,883,917	4,994,163	75,504,663	10,787,558
Philadelphia	311,417	25,533	1,390,671	204,265
Maryland	137,461	8,871	381,550	50,016
Virginia	.....	.....	103,267	12,275
Georgia	1,190,725	72,679	641,161	81,558
Los Angeles	8,514,167	586,473	11,132,046	1,459,349
San Francisco	145,600	10,658	160,270	25,508
Oregon	47,040	3,684	11,254	1,623
Indiana	.....	.....	324,740	40,599
Ohio	.....	.....	3,539,526	472,714
Colorado	112,000	9,764	396,480	57,723
Totals	80,290,775	$5,968,840	96,306,480	$13,615,617

Principal Rubber Stocks

Long Tons—1931

	Jan.	Feb.	Mar.	Apr.	May	June
Malay Estates	25,770	25,056	22,492	21,406	21,901	.....
S. S. Dealers	42,202	42,986	44,317	41,456	40,069	42,066
Other Malay Dealers	15,850	17,971	17,735	15,697	15,270	.....
Malayan Ports	6,104	5,178	3,983	3,401	3,143	4,507
Totals	89,926	91,191	88,527	81,960	80,383	.....
London	81,093	82,265	84,736	86,982	86,726	*82,345
Liverpool	43,292	44,656	49,094	51,879	53,668	*54,300
Totals	124,385	126,921	133,830	138,861	140,394	*136,645
U. S. Inventory	207,085	210,611	215,523	224,211	219,405	225,346
U. S. Afloat	55,439	63,680	63,133	56,700	73,564	69,421
Europe Afloat	24,500	24,580	21,990	18,500	*20,009	*17,500
Totals	79,939	88,260	85,123	75,200	93,564	*86,921
Grand totals	501,335	516,983	523,003	520,232	533,746	.....

*Estimate.
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Rubber, Balata, and Gutta Percha

Exports from Para to United States

	Pounds 1929	Pounds 1930
Rubber, washed	2,638,080	966,624
Rubber, unwashed	19,727,014	13,132,623
Balata, washed	68,243	51,202
Balata, unwashed	1,121,046	1,257,824
Gutta percha	.....	2,905

Exports of Balata and Perillo from Colombia

	Kilos 1929	Kilos 1930
Balata to		
Brazil	52,594	38,428
United States	52,285	50,892
France	.....	143
Great Britain	3,099	7,083
Peru	12,412	21,065
Totals	120,390	117,611
	1929	1930
Perillo to		
United States	159,086	19,688

United States Statistics

Imports of Crude and Manufactured Rubber

	April, 1931		Four Months Ended April, 1931	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	99,761,608	$7,712,941	347,743,338	$28,825,006
Liquid latex	833,105	73,867	3,194,148	309,330
Jelutong or pontianak	1,514,337	140,309	4,853,697	441,109
Balata	490,198	69,284	778,398	138,523
Gutta percha	1,644	985	124,974	14,328
Guayule	.....	.....	.....	.....
Siak, scrap, and reclaimed	714,966	8,888	2,820,941	37,275
Totals	103,315,858	$8,006,274	359,515,496	$29,765,571
Chicle *Dutiable*	.....	.....	.....	.....
Chicle, crude *Free*	534,236	$261,001	3,198,345	$1,572,151
MANUFACTURED—*Dutiable*				
Tires *number*	178	$3,034	3,425	$18,504
Other rubber manufactures	.....	83,339	.....	294,267
Totals	.....	$86,373	.....	$312,771

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	6,038,063	$539,571	20,273,311	$1,790,092
Balata	11,905	4,413	51,580	12,742
Guayule	.....	.....	24,700	3,575
Gutta percha, rubber substitutes, and scrap	2,681	381	4,883	763
Rubber manufactures	.....	894	.....	3,140
Totals	.....	$545,259	.....	$1,810,312

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed	1,293,422	$65,972	5,833,925	$290,715
Scrap and old	3,805,077	106,248	16,536,172	436,565
Rubberized automobile cloth *sq. yd.*	90,759	40,796	327,682	148,062
Other rubberized piece goods and hospital sheetings *sq. yd.*	119,089	47,445	386,205	162,414
Footwear				
Boots *pairs*	28,432	71,989	131,631	322,569
Shoes *pairs*	80,620	46,202	328,969	225,886
Canvas shoes with rubber soles *pairs*	177,782	117,715	700,624	469,238
Soles *doz. pairs*	4,977	14,667	21,171	61,368
Heels *doz. pairs*	59,839	42,385	290,795	200,217
Water bottles and fountain syringes *number*	21,338	10,406	108,921	46,466
Gloves *doz. pairs*	7,967	20,331	30,578	81,017
Other druggists' sundries	.....	36,958	.....	113,804
Balloons *gross*	51,154	49,602	217,179	196,842
Toys and balls	.....	15,248	.....	39,909
Bathing caps *doz.*	24,865	46,226	83,362	155,516
Bands	56,101	21,639	181,280	71,449
Erasers	33,096	19,072	146,899	89,057
Hard rubber goods				
Electrical goods	66,241	8,618	507,752	59,089
Other goods	.....	19,461	.....	85,616
Tires				
Truck and bus casings *number*	41,873	1,038,913	157,480	3,376,859
Other automobile casings *number*	151,051	1,187,523	562,752	4,290,003
Tubes, auto. *number*	118,502	158,515	463,099	647,243
Other casings and tubes *number*	8,467	22,858	32,451	67,382
Solid tires for automobiles and motor trucks *number*	1,038	32,047	4,075	134,437
Other solid tires	100,666	13,301	575,594	85,633
Tire sundries and repair materials	.....	75,036	.....	292,611
Rubber and friction tape	88,281	24,774	409,688	121,002
Belting	304,463	138,458	1,120,234	522,749
Hose	434,749	142,396	1,858,027	550,485
Packing	115,091	47,992	475,781	195,764
Thread	140,922	112,170	552,623	518,932
Other rubber manufactures	.....	158,938	.....	612,487
Totals	.....	$3,953,901	.....	$14,671,386

London Stocks, May, 1931

	Landed for May	Delivered for May	Stocks May 31		
LONDON	Tons	Tons	1931 Tons	1930 Tons	1929 Tons
Plantation	5,720	5,993	86,608	77,206	31,129
Other grades	26	1	75	52	86
LIVERPOOL					
Plantation	*3,522	*1,760	*53,641	*25,415	*4,538
Total tons, London and Liverpool	9,268	7,754	140,324	102,673	35,753

* Official returns from the recognized public warehouses.

United Kingdom Statistics

Imports

	May, 1931		Five Months Ended May, 1931	
UNMANUFACTURED	Pounds	Value	Pounds	Value
Crude Rubber				
From				
Straits Settlements	9,606,500	£131,977	72,367,400	£1,134,934
Federated Malay States	5,208,400	70,900	31,962,600	539,504
British India	599,900	7,771	6,037,600	99,382
Ceylon and Dependencies	1,364,200	18,479	12,703,300	211,021
Java and Dutch Borneo	1,909,300	25,947	13,550,300	222,762
Sumatra and other Dutch possessions in Indian Seas	1,610,900	22,207	8,774,500	146,983
Other countries in East Indies and Pacific, not elsewhere specified	262,300	3,757	1,939,100	32,841
Brazil	221,000	4,149	2,549,100	54,702
South and Central America (except Brazil)	12,400	191	24,500	347
West Africa				
French West and Equatorial Africa	4,800	79	21,000	382
Gold Coast	27,500	379	146,900	2,248
Other parts of West Africa	232,100	4,163	807,700	13,763
East Africa, including Madagascar	800	10	153,900	2,576
Other countries	69,500	1,556	518,300	10,628
Totals	21,129,600	£291,565	151,556,200	£2,472,073
Gutta percha and balata	216,400	11,546	1,500,400	108,381
Waste and reclaimed rubber	703,900	6,855	3,478,000	33,626
Rubber substitutes, synthetic	1,300	30	6,600	154
Totals	22,051,200	£309,996	156,541,200	£2,614,234
MANUFACTURED				
*Tires and tubes				
Pneumatic				
Outer covers	.....	£20,413	.....	£82,908
Inner tubes	.....	5,524	.....	25,257
Solid tires	.....	1,738	.....	14,085
Boots and shoes *doz. pairs*	166,973	160,317	647,596	679,992
Other rubber manufactures	.....	161,528	.....	750,455
Totals	.....	£349,520	.....	£1,552,697

Exports

UNMANUFACTURED				
Waste and reclaimed rubber	895,300	£7,925	6,067,100	£39,459
Rubber substitutes, synthetic	34,200	650	207,600	3,944
Totals	929,500	£8,575	6,274,700	£43,403
MANUFACTURED				
Tires and tubes				
Pneumatic				
Outer covers	.....	£330,888	.....	£1,243,993
Inner tubes	.....	39,918	.....	154,287
Solid tires	.....	5,251	.....	24,240
Boots and shoes *doz. pairs*	17,949	22,330	81,770	101,689
Other rubber manufactures	.....	191,806	.....	860,229
Totals	.....	£590,193	.....	£2,384,438

Exports—Colonial and Foreign

UNMANUFACTURED				
Crude Rubber				
To				
Soviet Union (Russia)	33,100	£444	10,949,900	£300,782
Sweden, Norway, and Denmark	134,000	2,642	683,400	17,055
Germany	1,412,700	22,599	7,626,200	133,725
Belgium	1,164,700	16,633	4,931,700	82,960
France	949,400	16,280	7,534,700	150,535
Spain	128,600	2,629	641,400	17,147
Italy	320,700	4,754	2,004,300	34,788
Other European countries	372,900	7,754	1,585,400	40,291
United States	346,300	7,924	835,800	20,896
Other countries	112,000	2,847	649,400	18,247
Totals	4,974,400	£84,506	37,442,200	£816,426
Gutta percha and balata	16,200	1,197	291,300	28,609
Waste and reclaimed rubber	14,100	115	96,100	1,491
Rubber substitutes, synthetic	.....	.....	.....	.....
Totals	5,004,700	£85,818	37,829,600	£846,526
MANUFACTURED				
Tires and tubes				
Pneumatic				
Outer covers	.....	£9,470	.....	£45,423
Inner tubes	.....	296	.....	2,130
Solid tires	.....	148	.....	152
Boots and shoes *doz. pairs*	1,991	2,914	8,726	12,098
Other rubber manufactures	.....	4,878	.....	23,627
Totals	.....	£17,706	.....	£83,430

*Motor cars, motorcycles, parts, and accessories were liable to duty from Sept. 29, 1915, until Aug. 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts, and accessories were exempt from duty until Apr. 30, 1926, inclusive, and tires and tubes until Apr. 11, 1927, inclusive.

United States Crude and Waste Rubber Imports for 1931 by Months

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manicobas and Matto Grosso	Totals 1931	Totals 1930	Balata	Miscellaneous	Waste
January ..... *tons*	36,525	206	331	36	..	..	..	37,098	47,362	65	960	38
February	35,749	339	516	40	1	..	..	36,645	43,728	1	580	..
March	38,922	352	1,062	2	..	..	..	40,338	45,430	170	800	..
April	46,034	323	291	..	..	..	..	46,648	49,927	196	908	60
May	30,962	248	508	2	..	..	..	31,720	40,745	78	450	2
June	44,495	601	640	40	..	..	..	45,776	42,653	271	892	6
Total, six months, 1931 ..... *tons*	232,687	2,069	3,348	120	1		..	238,225	.....	781	4,590	106
Total, six months, 1930 ..... *tons*	262,532	1,906	4,332	232	180	663	..	.....	269,845	703	4,395	395

Compiled from Rubber Manufacturers Association statistics.

Plantation Rubber Crop Returns by Months

Summary of 615 Producing Companies

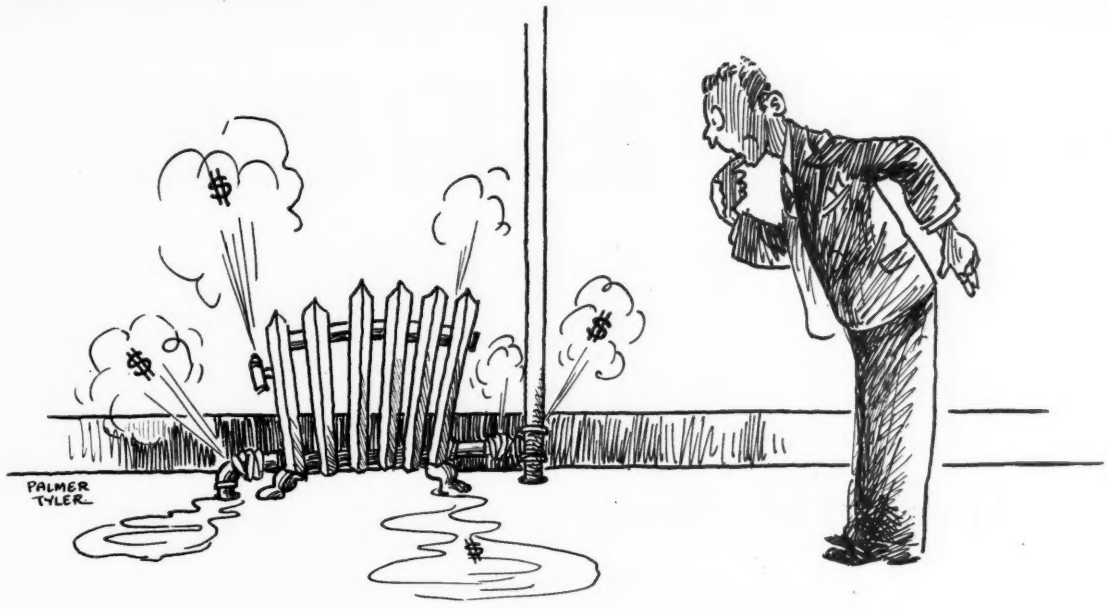
	Br. N. Borneo (26 Companies)		Ceylon (102 Companies)		India and Burma (21 Companies)		Malaya (338 Companies)		Netherlands East Indies — Java (60 Companies)		Netherlands East Indies — Sumatra (60 Companies)		Miscellaneous (8 Companies)		Total (615 Companies)	
	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index
1931																
January	473	96.7	1,776	87.0	397	70.6	13,006	104.6	3,020	115.0	4,324	107.2	225	124.3	23,221	103.8
February	365	74.6	1,138	55.8	160	28.5	11,551	92.9	2,631	100.2	3,721	92.3	130	71.8	19,696	88.1
March	378	77.3	1,065	62.2	510	90.7	11,393	91.6	3,174	120.9	4,173	103.5	182	100.6	20,875	93.3
April	351	71.8	1,698	83.2	672	119.6	10,391	83.6	3,069	116.9	3,729	92.5	208	114.9	20,118	90.0
May	425	86.9	1,355	66.4	649	115.5	11,696	94.1	3,236	123.2	4,075	101.1	203	112.2	21,639	96.8
June	400	81.8	970	47.5	233	41.5	11,766	94.6	3,044	115.9	4,253	105.5	209	115.5	20,875	93.3
Six months ending June																
1931	2,392	....	8,002	....	2,621	....	69,803	....	18,174	....	24,275	....	1,157	....	126,424	....
1930	2,404	....	8,795	....	2,783	....	62,988	....	15,044	....	20,846	....	1,065	....	113,925	....
1929	2,746	....	9,968	....	2,960	....	69,585	....	16,352	....	22,284	....	972	....	124,867	....

NOTE. Index figures throughout are based on the monthly average for 1929 = 100. Issued July 11, 1931, by the Commercial Research Department, The Rubber Growers' Association, Inc., London, England.

Rubber Goods Production Statistics

	1931 May	Apr.	Mar.	Feb.	Jan.	1930 Dec.	Nov.	Oct.	Sept.	Aug.	July	June	May
TIRES AND TUBES													
Pneumatic casings													
Production ..... *thousands*	....	3,955	3,730	3,188	2,940	2,251	2,123	2,866	2,692	3,332	3,193	4,098	4,574
Shipments													
Domestic ..... *thousands*	....	3,804	3,143	2,580	2,855	2,550	2,119	2,613	3,360	3,976	4,229	4,050	3,960
Exports ..... *thousands*	....	142	155	142	140	139	148	186	165	164	129	185	213
Stocks, end of month ..... *thousands*	....	8,025	8,012	7,629	7,166	7,203	7,676	7,842	7,849	8,678	9,449	10,622	10,745
Solid and cushion tires													
Production ..... *thousands*	....	12	11	11	13	13	13	18	14	16	13	17	17
Shipments													
Domestic ..... *thousands*	....	14	15	12	12	12	13	19	22	22	19	18	23
Exports ..... *thousands*	....	1	1	1	1	1	1	1	1	1	1	2	1
Stocks, end of month ..... *thousands*	....	64	69	73	75	76	76	78	82	90	101	107	108
Inner tubes													
Production ..... *thousands*	....	3,693	3,560	3,133	2,898	2,448	2,144	3,161	3,053	3,837	3,151	3,960	4,428
Shipments													
Domestic ..... *thousands*	....	3,610	2,922	2,619	3,147	2,634	2,147	2,659	3,525	4,492	4,594	4,082	3,940
Exports ..... *thousands*	....	99	109	101	102	96	84	119	108	118	90	131	119
Stocks, end of month ..... *thousands*	....	8,330	8,380	7,937	7,552	7,999	8,250	8,414	8,052	8,589	9,326	10,889	11,082
Raw material consumed													
Fabrics ..... *thous. of lbs.*	....	15,244	14,041	12,002	12,738	8,358	8,418	11,780	10,917	13,223	13,399	15,034	17,437
Crude rubber ..... *thous. of lbs.*	....	45,016	41,851	36,651	36,319	25,537	26,253	36,097	33,382	40,736	39,365	45,706	52,130
MISCELLANEOUS RUBBER PRODUCTS													
Calendered rubber clothing													
Net orders ..... *no. coats and sundries*	19,380	16,846	19,380	16,361	21,884	12,881	15,493	25,082	39,364	26,348	28,767	21,249	110,520
Production ..... *no. coats and sundries*	18,094	16,803	19,220	18,276	13,059	20,791	22,623	41,291	37,097	44,952	38,582	55,411	75,719
Mechanical rubber goods, shipments													
Belting ..... *thous. of dollars*	....	832	889	722	759	675	779	954	1,045	1,248	1,364	1,238	1,310
Hose ..... *thous. of dollars*	....	2,129	1,892	1,611	1,440	1,337	1,276	1,554	1,473	1,682	1,856	2,199	2,703
All other ..... *thous. of dollars*	....	1,656	1,631	1,378	1,400	1,326	1,345	1,678	1,565	1,622	1,690	1,881	2,150
Total ..... *thous. of dollars*	....	4,617	4,412	3,711	3,599	3,338	3,400	4,186	4,083	4,552	4,910	5,318	6,163
Rubber bands, shipments ..... *thous. of lbs.*	....	259	231	222	211	165	165	197	172	164	174	177	211
Rubber flooring, shipments ..... *thous. of sq. ft*	569	569	496	366	365	597	432	682	529	559	507	634	615
Rubber heels													
Production ..... *thous. of pairs*	....	15,408	14,661	13,156	12,973	13,101	11,083	16,460	14,322	13,735	15,117	15,795	15,603
Shipments													
Exports ..... *thous. of pairs*	....	578	577	658	748	838	880	966	1,083	780	938	829	776
Repair trade ..... *thous. of pairs*	....	4,038	4,868	4,854	3,939	3,450	4,473	8,291	6,681	6,622	5,053	5,186	5,221
Shoe manufacturers ..... *thous. of pairs*	....	10,112	10,991	8,397	8,471	6,618	4,578	9,354	9,244	8,813	11,668	10,287	7,432
Stocks, end of month ..... *thous. of pairs*	....	27,764	26,708	29,335	30,302	29,741	29,130	29,353	31,601	33,226	36,220	38,852	38 595
Rubber-proofed fabrics, production													
Auto fabrics ..... *thous. of yds.*	982	710	738	644	577	476	532	915	733	678	608	851	1,239
Raincoat fabrics ..... *thous. of yds.*	....	1,040	863	567	738	697	1,426	3,040	3,249	1,805	1,415	1,486	1,333
All other ..... *thous. of yds.*	....	1,271	1,168	973	891	736	864	1,254	1,064	975	917	1,042	1,025
Total ..... *thous. of yds.*	....	3,381	2,769	2,184	2,206	1,909	2,822	5,209	5,046	3,458	2,940	3,379	3,597
Rubber soles													
Production ..... *thous. of pairs*	....	2,692	2,292	2,724	2,481	3,021	1,426	3,056	2,193	1,473	2,663	2,734	1,939
Shipments													
Exports ..... *thous. of pairs*	....	69	14	36	11	58	60	82	74	74	34	31	27
Repair trade ..... *thous. of pairs*	....	255	408	290	287	243	280	492	333	317	364	309	332
Shoe manufacturers ..... *thous. of pairs*	....	2,474	2,145	2,259	2,090	2,305	1,011	2,638	1,691	1,161	2,627	2,549	1,506
Stocks, end of month ..... *thous. of pairs*	....	2,764	2,876	3,167	3,032	2,917	2,390	2,520	2,729	2,289	2,876	3,307	3,019

Source: *Survey of Current Business*, Bureau of Foreign and Domestic Commerce, Washington, D. C.



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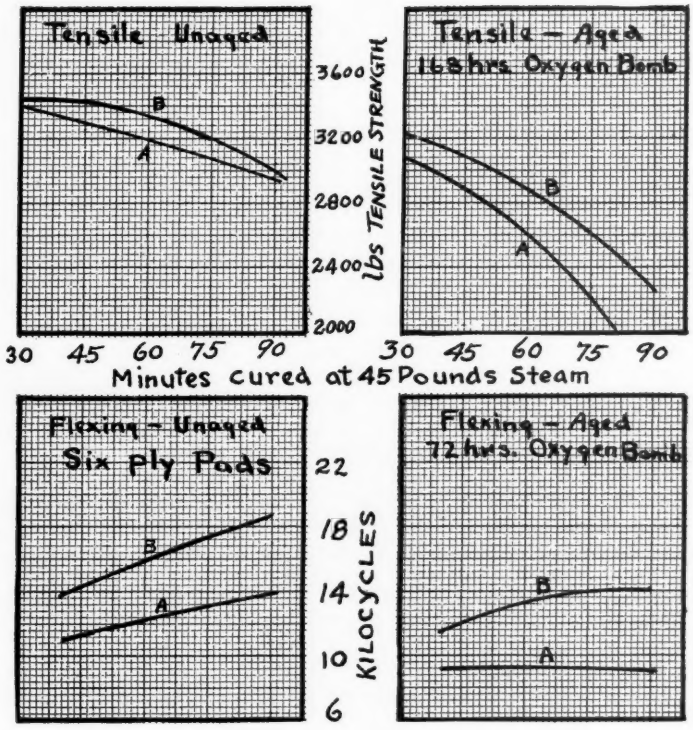

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	A	B
Smoked Sheets	100.00	100.00
Zinc Oxide	40.00	40.00
Sulfur	3.50	3.50
Pine Tar	2.00	2.00
Laurex	.75	.75
Antioxidant	1.00	—
Accelerator	.50	.30
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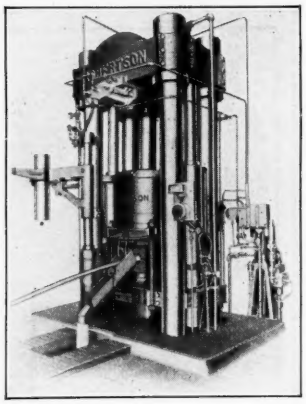

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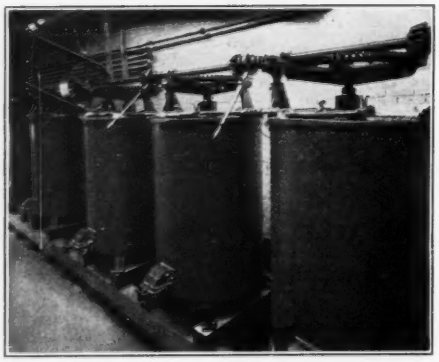

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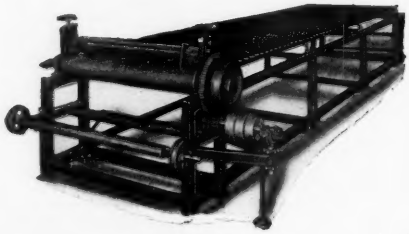

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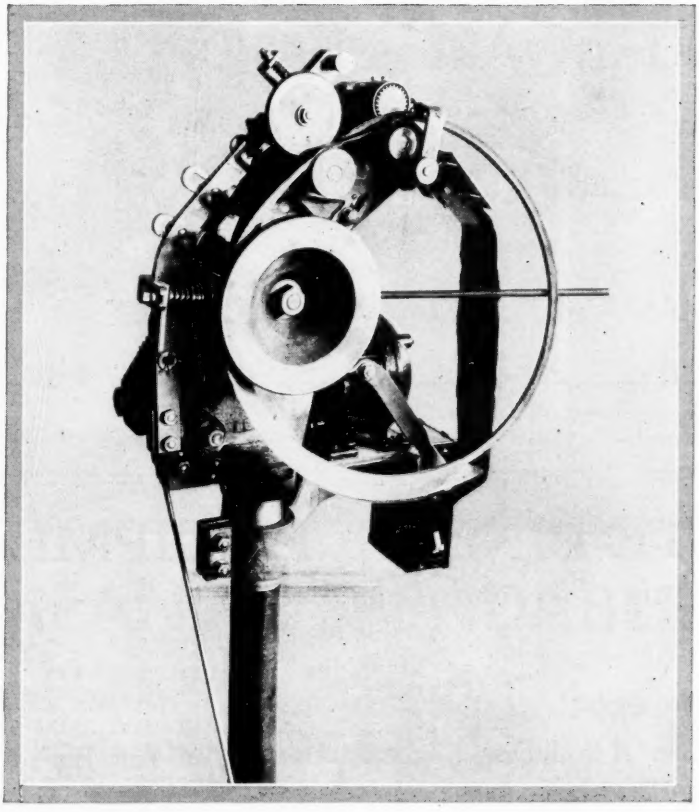

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Electric Timers
General Machine Work

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- (b) Washer Type
- (c) Ring Type
- (d) Wooden (Truck)
- (e) Aluminum (Truck)

Curing Rings

Drums (Tire Building)
- (a) Auto-Drum
- (b) Standard Collapsible

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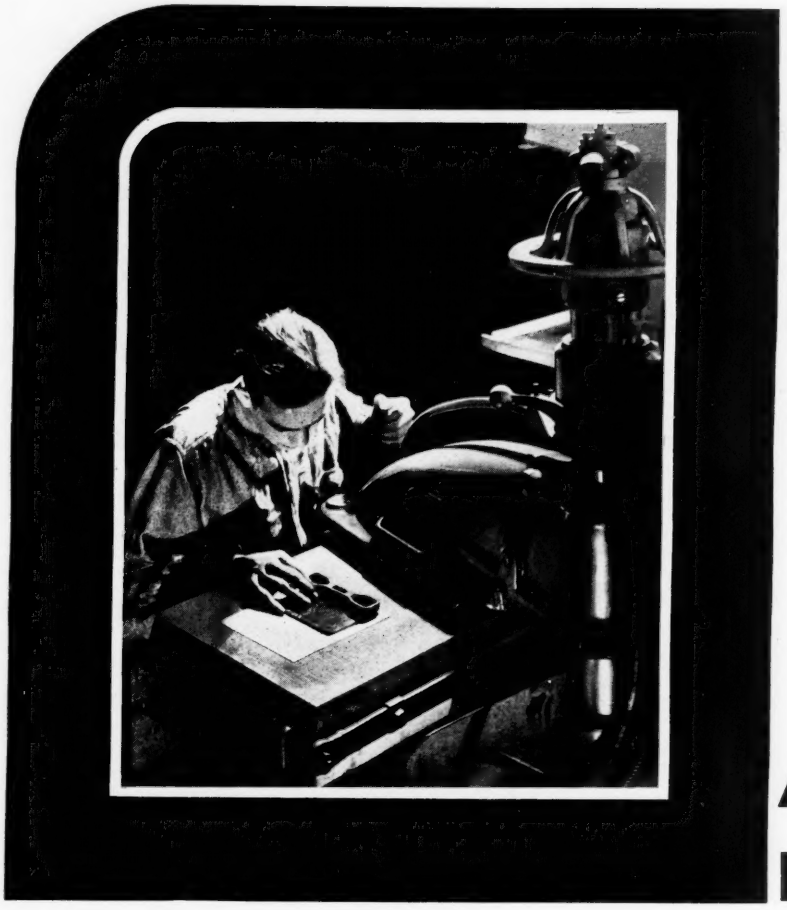

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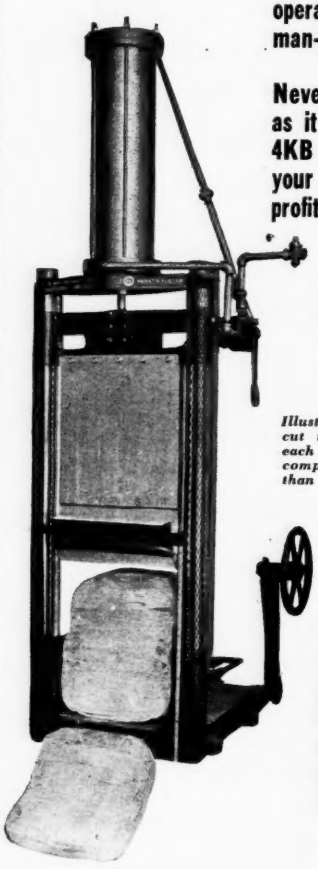

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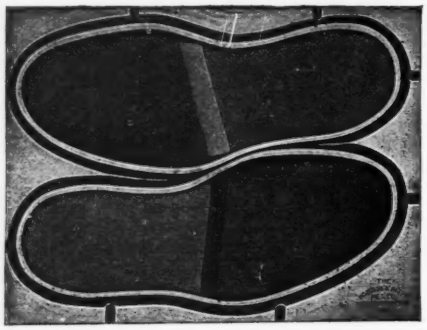

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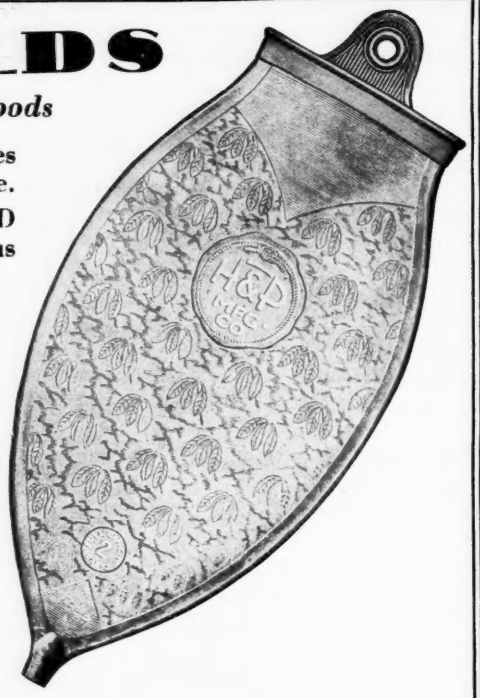

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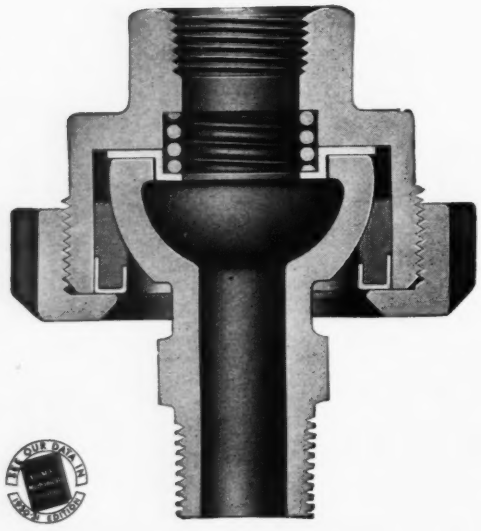

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"The Desirable Properties of Synthetic Compositions for Industrial Purposes," W. D. Owen, A.M.I.E.E.
"A Review of the Contributions of X-ray to Rubber," C. W. Shacklock, M.Sc., A.I.C., A.I.R.I. (Sc.)
"The Influence of White Factice on the Vulcanisation of Accelerated Rubber Stocks," W. H. Bodger, B.Sc., and H. C. Baker, B.Sc.
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"Some Aspects of Standardisation," B. D. Porritt, M.Sc., F.I.C., F.R.S.E., F.I.R.I.
"The Evaluation of Raw Rubber," G. Martin, B.Sc., A.I.C., F.I.R.I.
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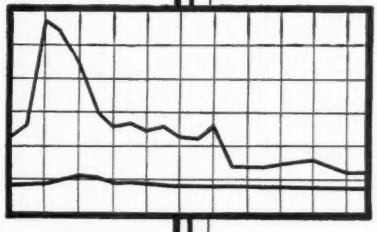

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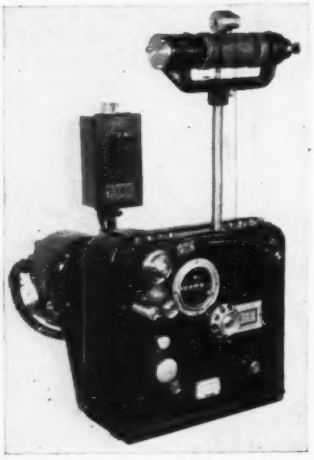

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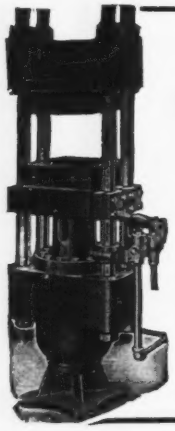

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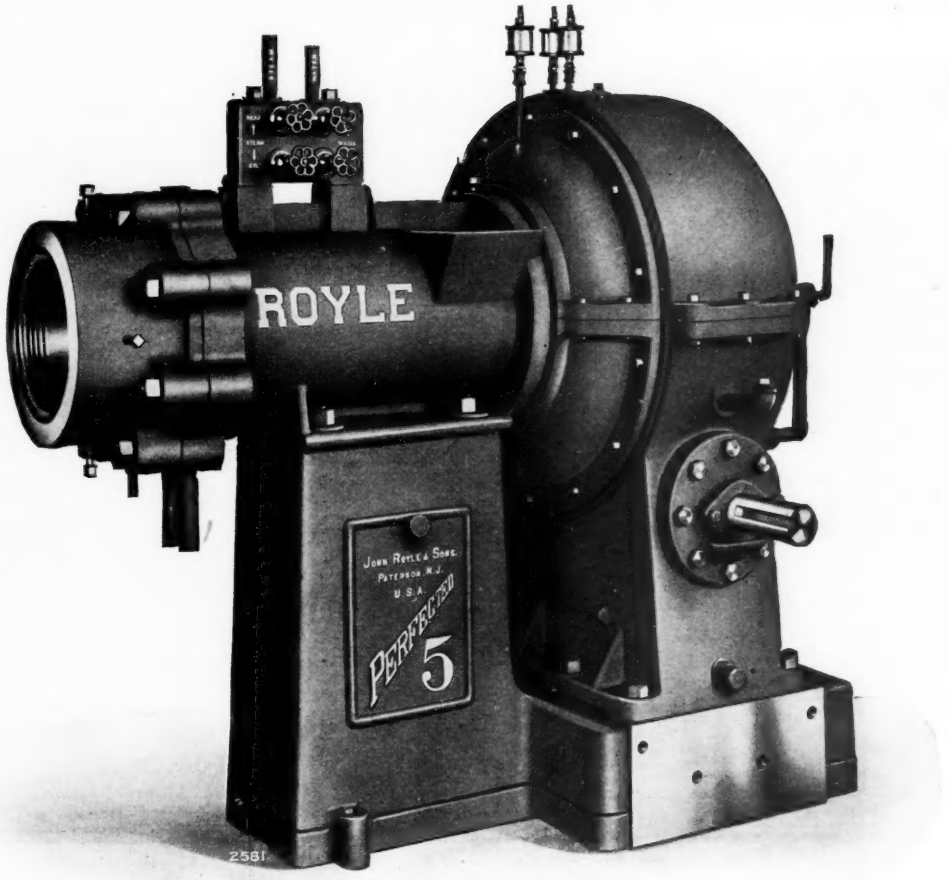

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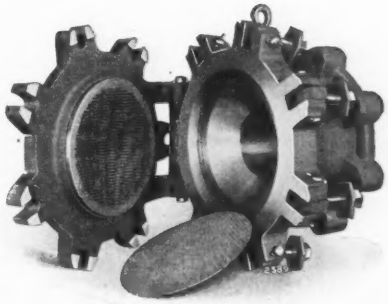

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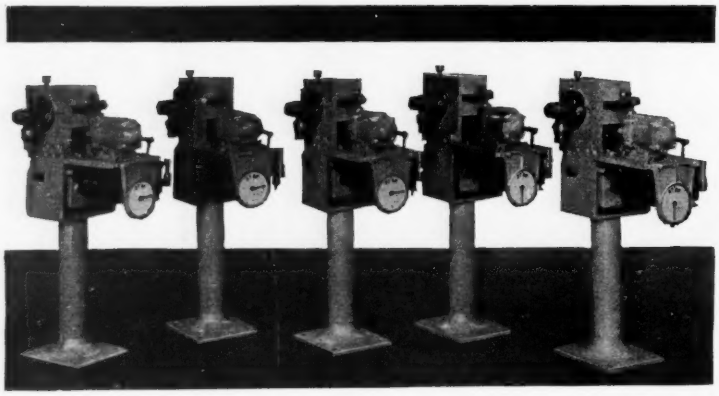

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Whatever molding operation is necessary, it can be accomplished automatically through the use of the Yarway Automatic Two Pressure Hydraulic Valve. A standard hydraulic valve is actuated by a motor-driven attachment and timing arrangement, which can be applied to the operation of any type of molding press.

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HYDRAULIC VALVE
(CASKEY PATENTS)

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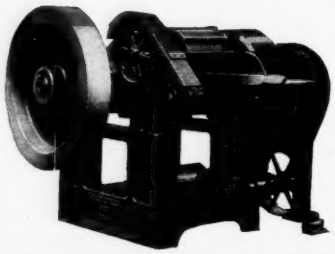

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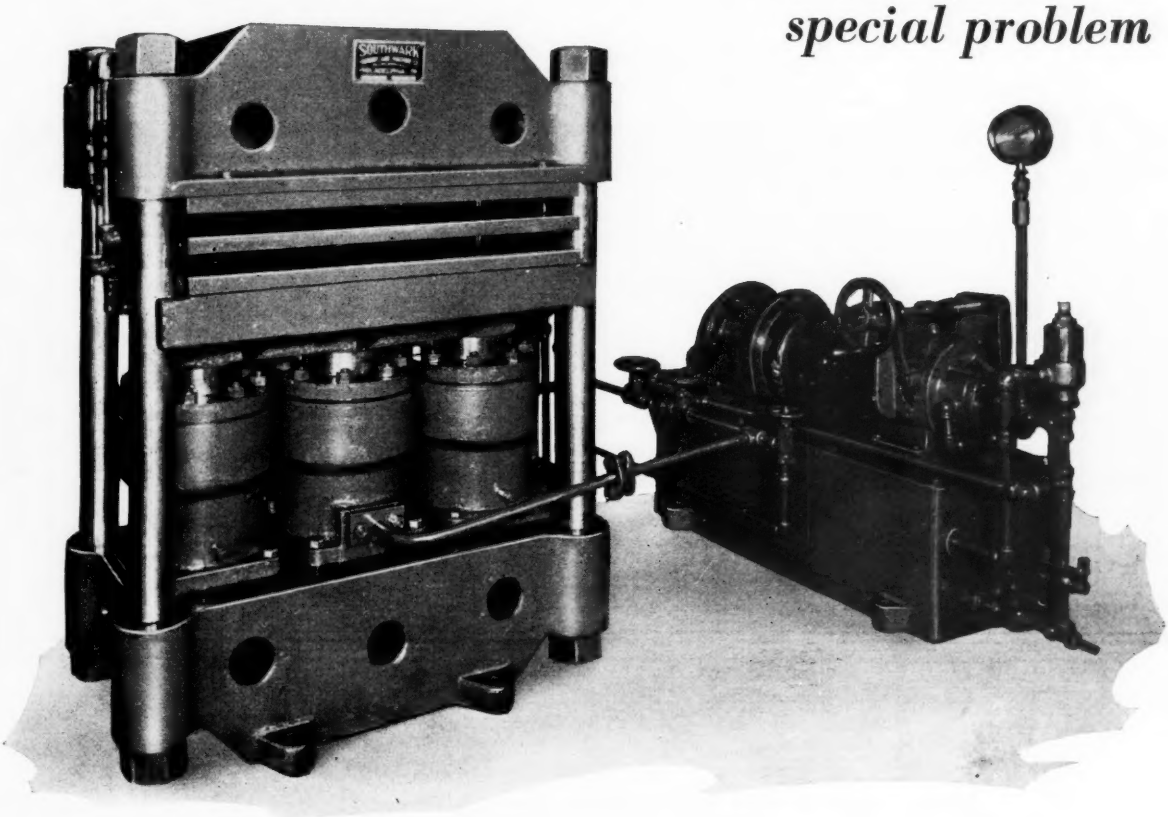

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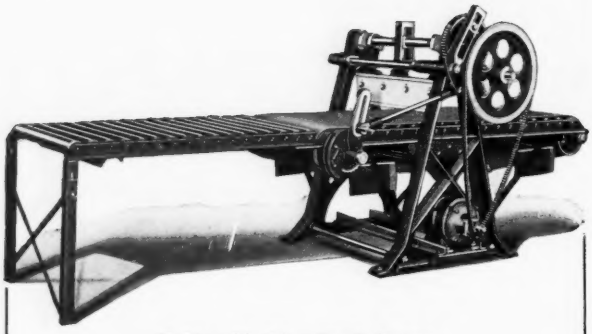

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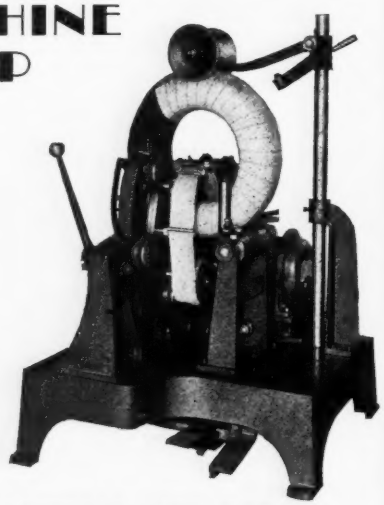

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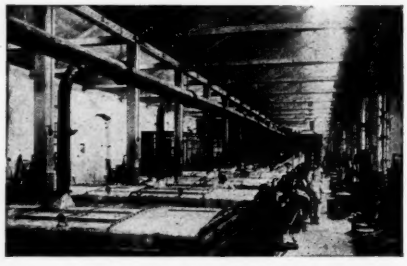

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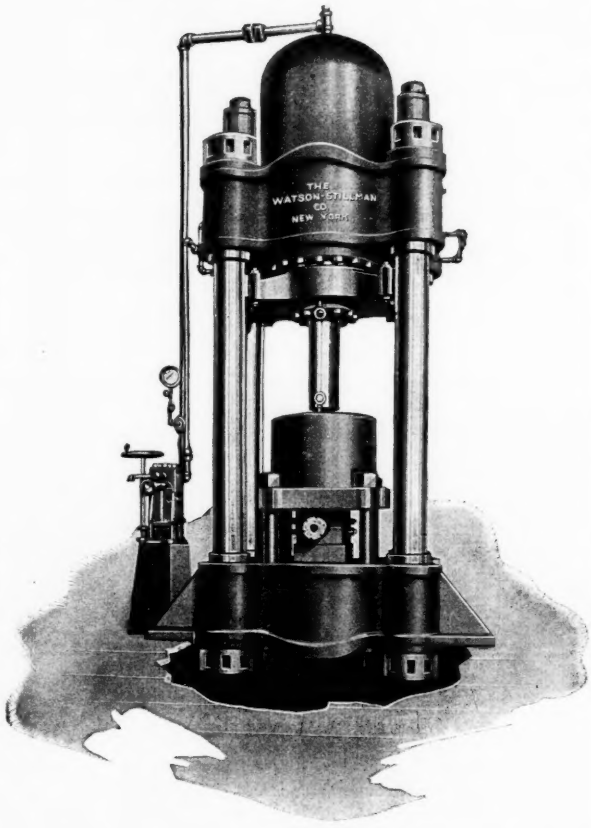

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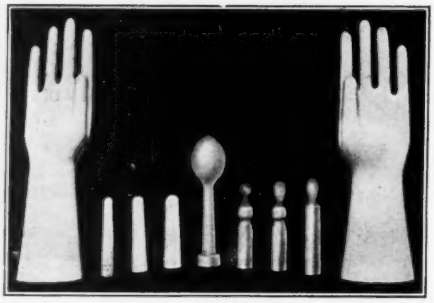

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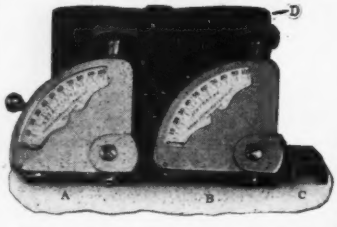

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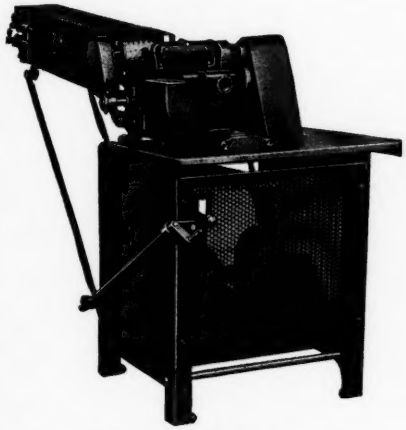

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THE USM DOUBLE CEMENTING MACHINE—MODEL B, is especially designed for cementing both sides of rag fillers, juniors, etc. A floor machine, motor-driven, with a capacity of 12,000 to 15,000 pairs daily.

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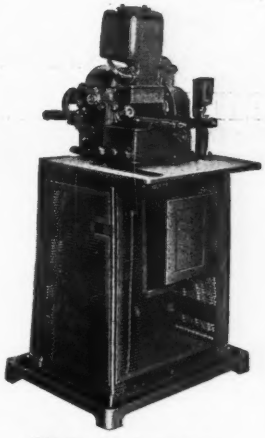

USM Double Cementing
Machine—Model B

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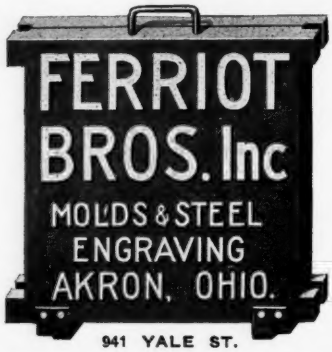

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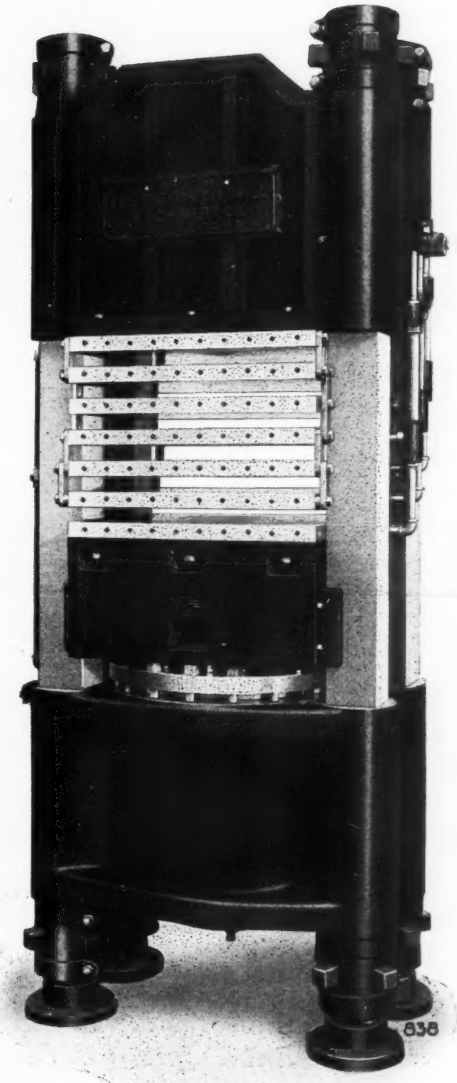

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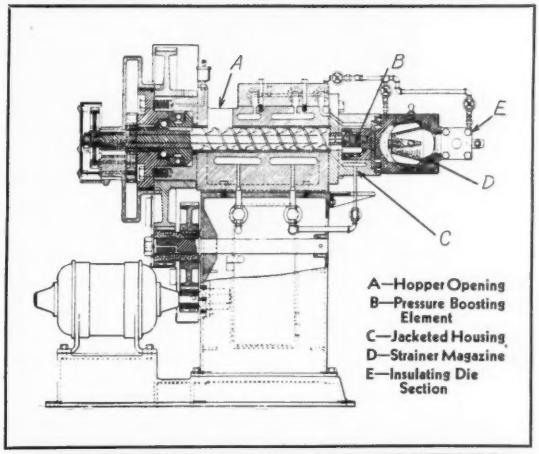

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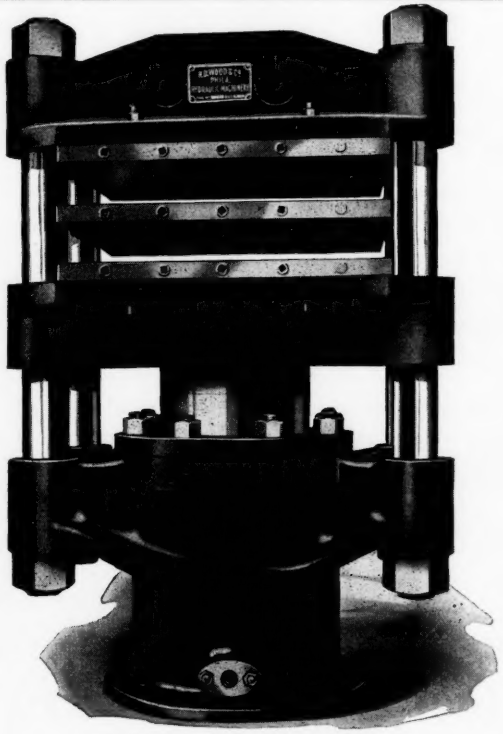

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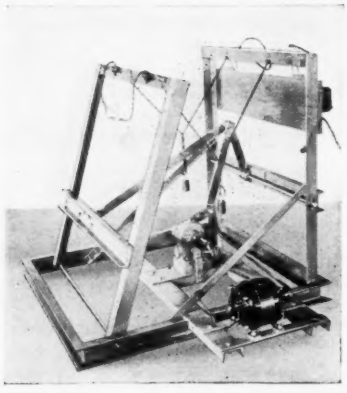

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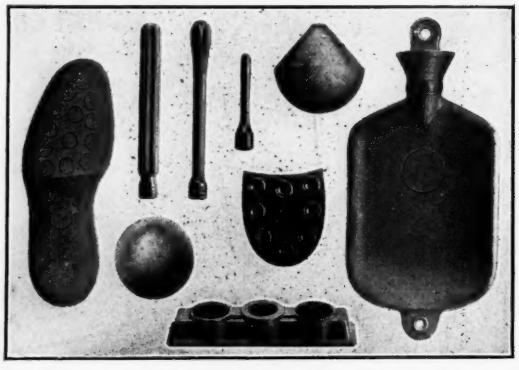

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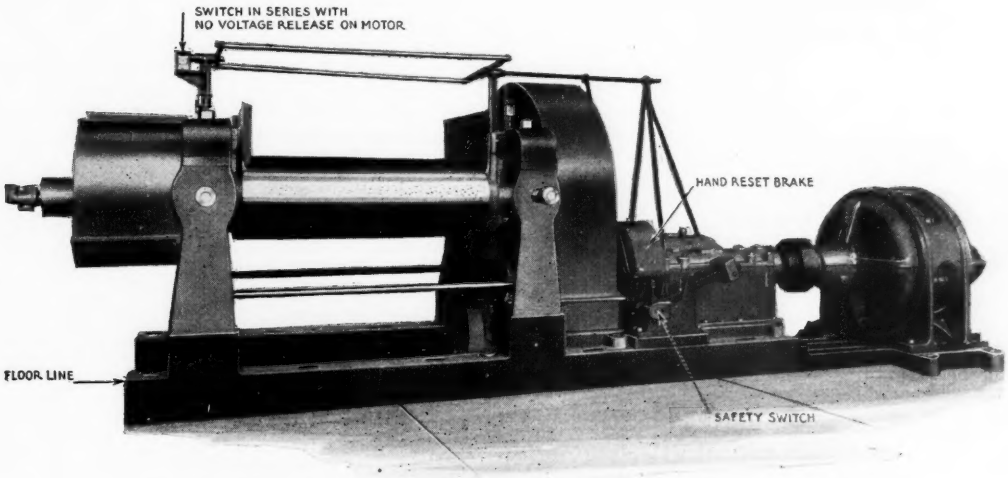

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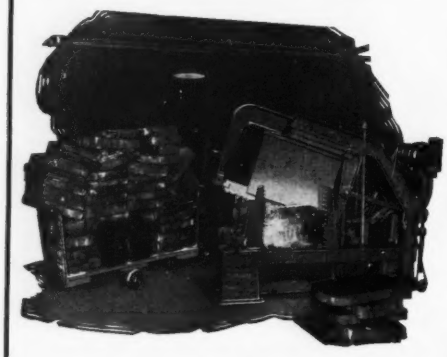

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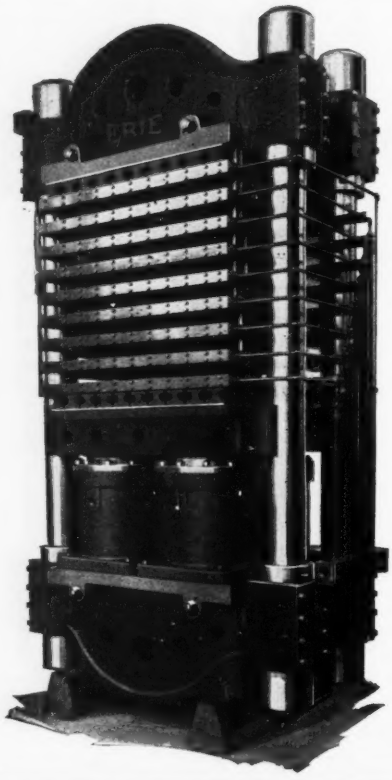

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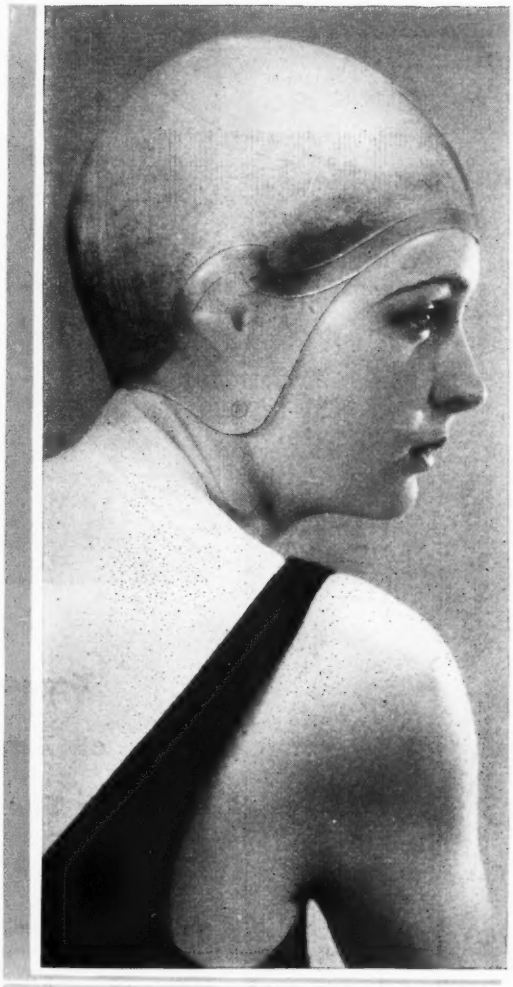

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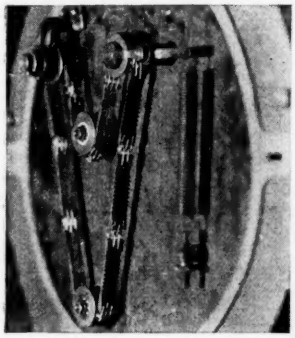

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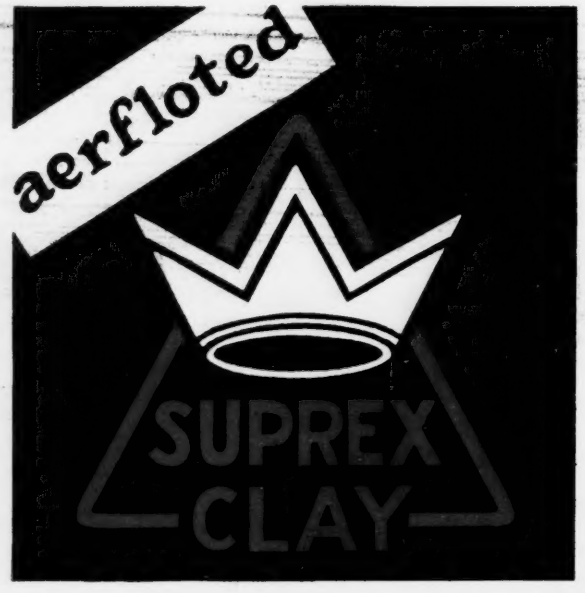

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